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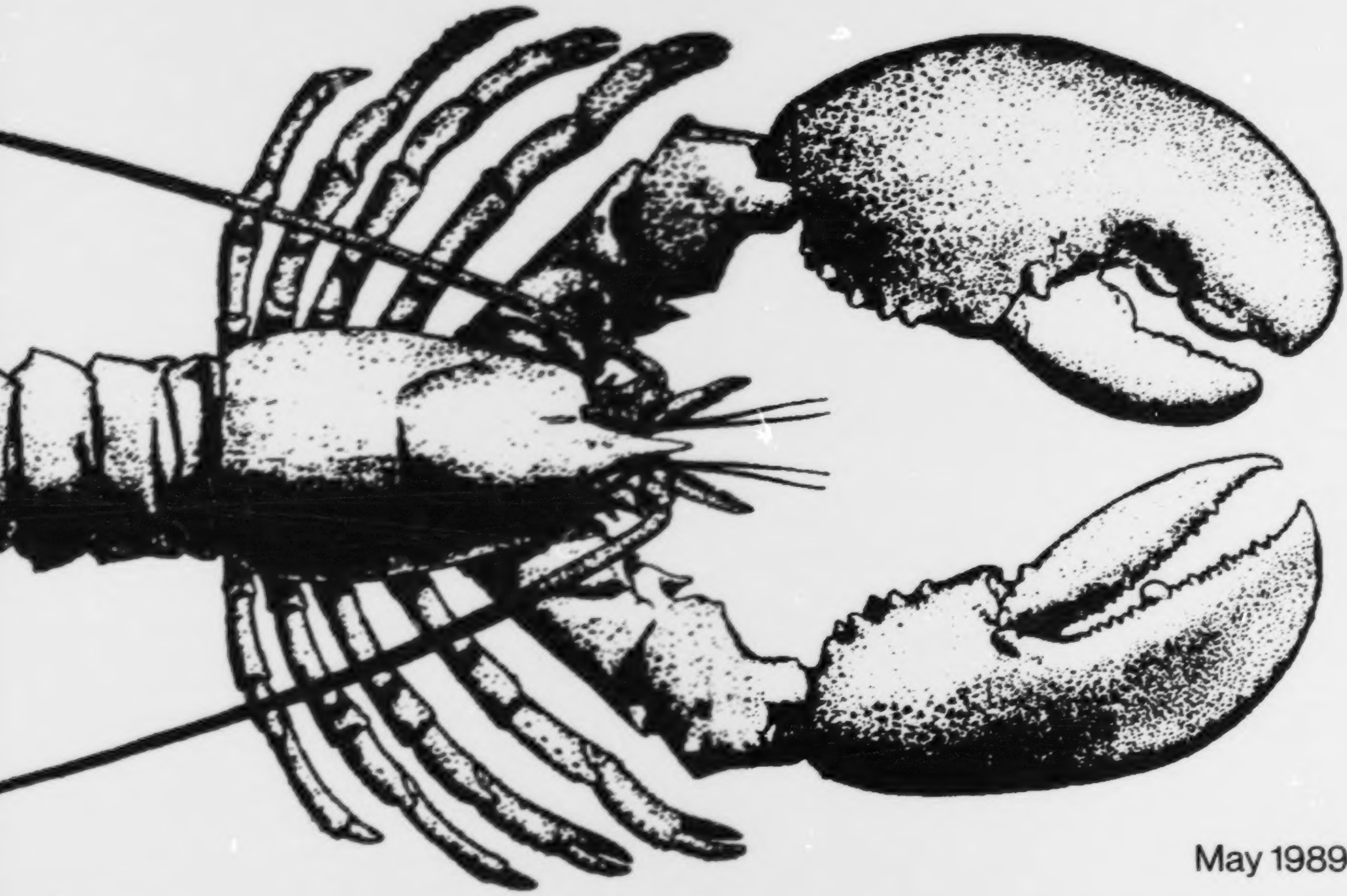
The Scotia-Fundy Lobster Fishery

Phase One: Issues and Considerations



May 1989

Fisheries and Oceans Pêches et Océans

Canada

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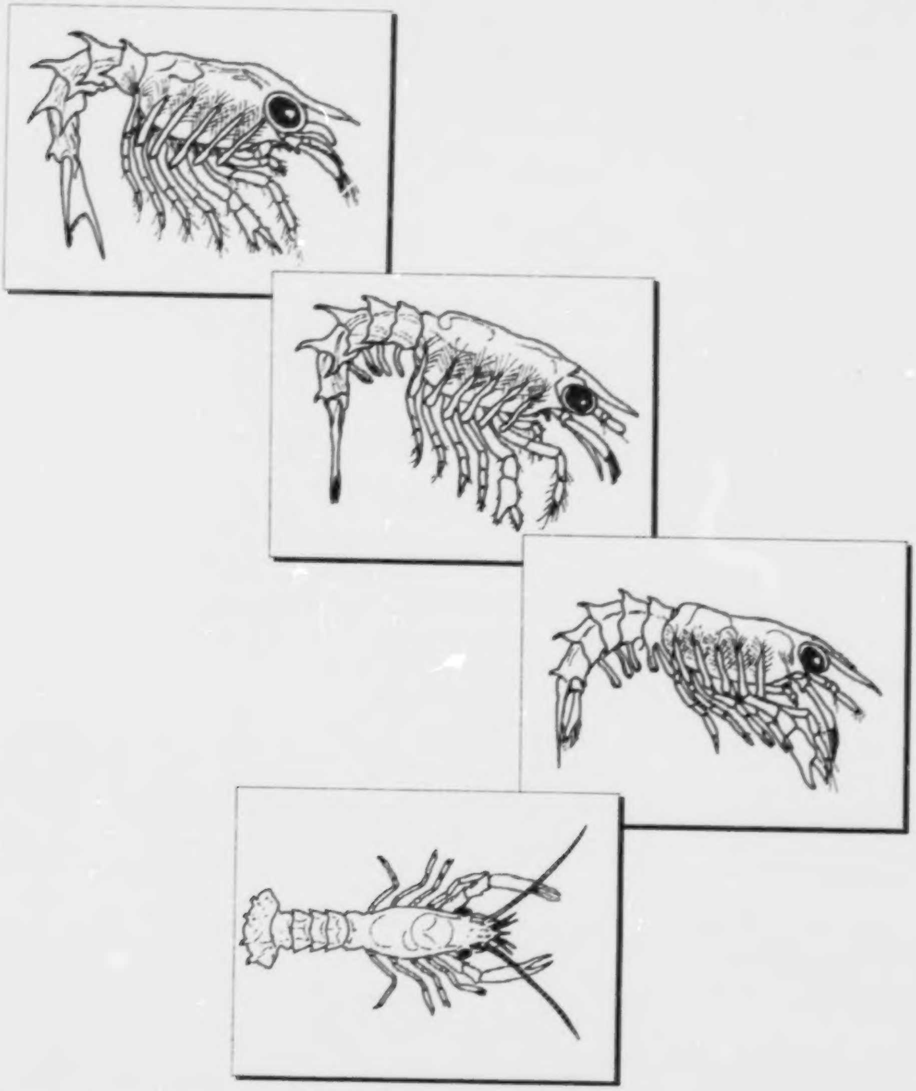

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FOREWORD

This report summarizes the major issues arising from Phase I of a study into the Scotia Fundy Lobster Fishery commissioned by the Minister of Fisheries and Oceans, the Honourable Tom Siddon. This part of the study has consolidated information from a wide variety of sources in order to examine the conditions in the fishery and the role it plays in the Region. The report is intended to serve as a working document for Phase II of the study which will develop recommendations for dealing with the issues identified. A survey of lobster fishermen and special consultations were used to gather and update information and to identify key issues of concern to fishermen and other interested groups. A draft of the report was circulated in March 1989 and a second round of consultation was undertaken on it. Comments received through that process have been used to refine this final report on Phase I.

The production of this report required extra effort by many people. The multidisciplinary nature of the study led to the establishment of a Steering Committee composed of John Pringle - Biological Sciences, John Angel - Fisheries and Habitat Management, and Leslie Burke - Economics of the Scotia-Fundy Regional staff and Doug McKone - Science, Barry Rashotte - Atlantic Fisheries, and Nancy Dale - Economic and Commercial Analysis of DFO, Ottawa. Gilles Thériault of GTA Consultants, Shediac was an independent member appointed to the committee by the Minister. I chaired the committee as Regional Director General.

Responsibility for the production of the report was placed on a working group which, in addition to contributions from the above, was supported by B. Miller, D. Pezzack, G. Jefferson, L. Muise, B. Huggins, M.C. Cormier, J. Nelson, R. Shotton and J. Raymond of Regional Staff and J. Roy of DFO Ottawa. Gardiner Pinfold, Consulting Economists conducted a special survey and produced a report on the harvesting sector.

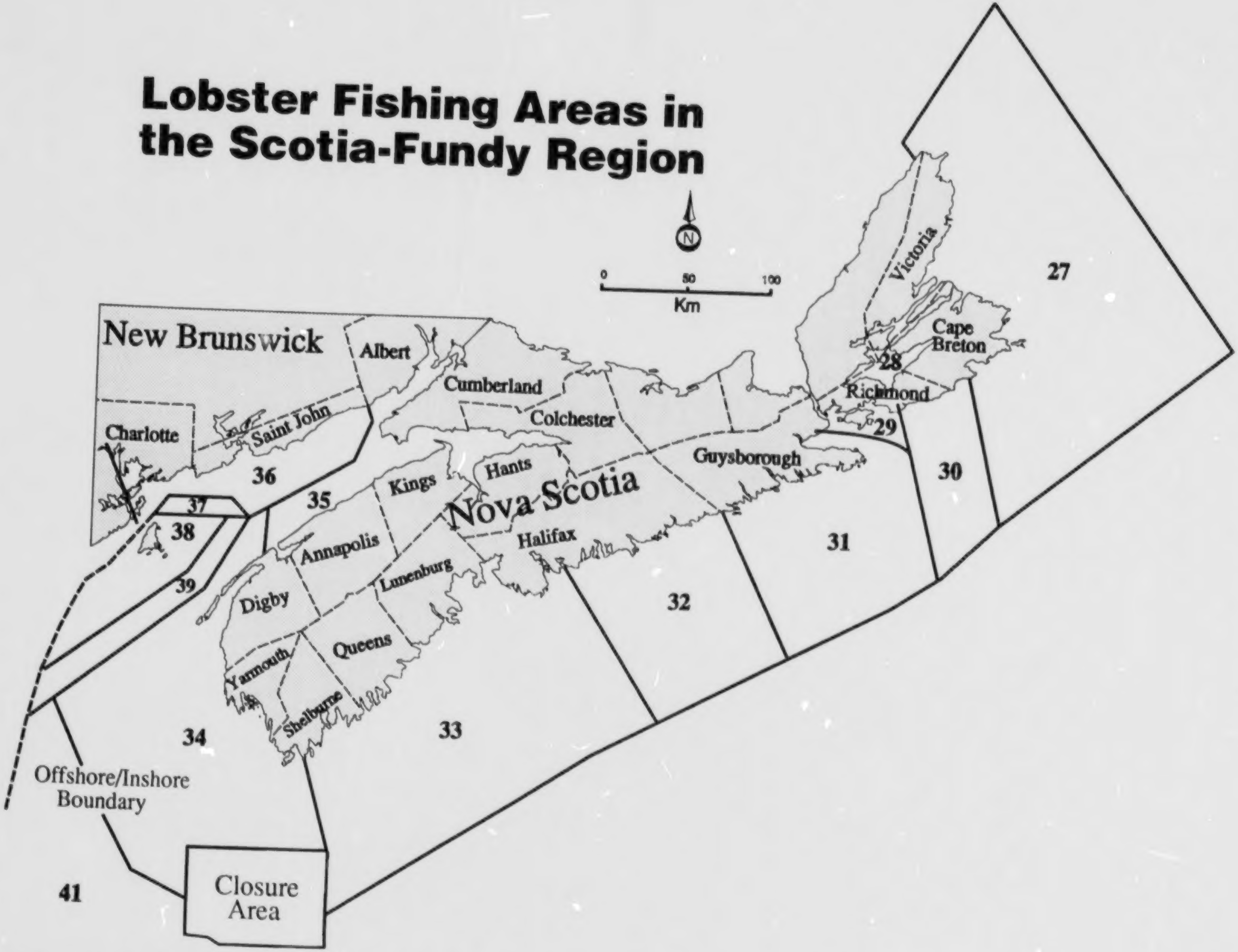
The report would not have been possible without extensive cooperation and a wide range of input from the fishing industry. Over a thousand fishermen took time to respond to our special questionnaire. Hundreds of others participated in cost and earnings surveys or assisted in biological research by maintaining fishing logs and returning tags, all of which were used in the research on which this report is based.

Thanks to all concerned. I hope this report will increase our understanding of this important industry and allow us to develop new approaches through which we can realize more of the potential benefits from this valuable resource.

Haché

J.-E. Haché
Regional Director-General
Scotia-Fundy Region

Lobster Fishing Areas in the Scotia-Fundy Region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1 INTRODUCTION

On April 29, 1988 the Minister of Fisheries and Oceans, the Honourable Tom Siddon, announced an in-depth study of the Scotia-Fundy lobster fishery. The study would review all the major issues facing the industry and would address, in the Minister's words, "the long-term social and economic viability of the fishery and of the communities which depend on it." In doing so it would look at the biological, licensing, management, marketing, and enforcement aspects of the lobster fishery.

The last major examination of the lobster fishery was done in 1975 when a task force studied the fishery throughout the Maritimes. At that time catch levels were low, the fishery was overcrowded and incomes were poor. This study focuses only on the Scotia-Fundy Region and occurs in entirely different circumstances. The 1980's have seen a dramatic upturn in catch levels throughout the northwest Atlantic. Almost all management areas in Scotia-Fundy enjoy high catch levels. In addition, the higher catch coincided with a period of economic growth and increased consumer buying power in Canada and its major trading partners – the United States, Europe and Japan. In the United States, per capita consumption of seafood has increased by 15% in the past decade. A relatively low value Canadian dollar made all Canadian products attractive in international markets. The lobster industry took advantage of this opportunity by opening new markets and selling lobster in new forms. Meanwhile the catch continued to increase. By 1987 it was double the 1970's levels. The market absorbed it all and supported annual increases in prices paid to fishermen. This allowed the price of lobster to keep pace with inflation, over the decade. The overall effect has been a substantial increase in the total value of the fishery. At the same time, management measures introduced to reduce and control harvesting capacity kept fishing costs down, creating an environment of real prosperity.

The industry is, however, not without problems. In many areas there is constant pressure to issue new inshore licences. On the other hand, prospects of developing a new offshore fishery in 1987/88 met with extreme resistance from a predominantly inshore industry. And while the recent pattern of high landings may continue, there are concerns the fishery is only at a high point in an ongoing up-and-down resource cycle. Also, changes are being introduced to minimum carapace size regulations in the United States which could affect operating costs and market opportunities. In addition the Canadian dollar could rise and erode our currency advantage. Finally, DFO's program responsibilities have increased due to new commercial fisheries, aquaculture, inspection issues, and environmental concerns at a time when government has been attempting to reduce public expenditures.

Reviews usually take place in times of crisis, when there is little flexibility to act and no time to introduce change. This is a rare opportunity to look realistically at the future of the lobster fishery. The report has responded to the Minister's initiative by examining ways to expand and improve the fishery. Some changes require short term sacrifices which should be considered now in a period of relative prosperity. While immediate prospects continue to be positive, history shows that dramatic turns for the worse can happen quickly. Measures which would place the industry on a stronger footing should not be delayed.

This study contains a comprehensive overview of the fishery with emphasis on recent developments. It examines the community base in which the fishery takes place and analyzes the resource according to current scientific understanding. It examines the harvesting, processing and marketing components of the industry in the Scotia-Fundy Region and describes the DFO management regime and its related costs. And on the basis of an extensive consultative process, with generally good participation by the industry, it presents the current views and concerns of fishermen on issues they consider of primary importance. The study has attempted to focus these different perspectives on key issues facing the fishery and to suggest alternative future courses of action to be considered by all concerned.

Objectives For Management

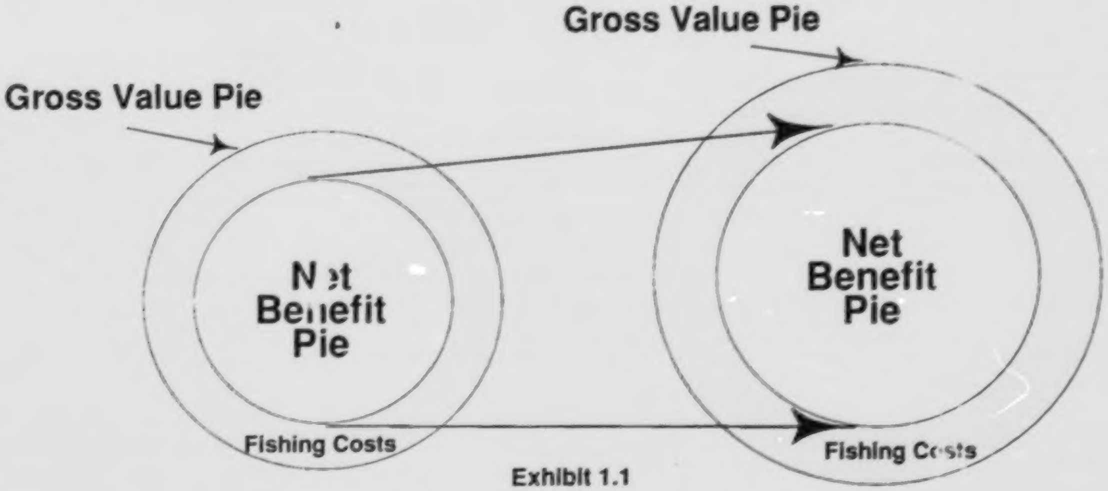
The Lobster Fishery Task Force of 1974-75, the last major study of the lobster fishery, made a number of proposals that were neither formally accepted nor rejected at the time, but were generally adopted by DFO managers as a matter of practice. The main objectives outlined by the task force were:

- a viable, self-sustaining industry;
- increasing participation by fishermen in management of the industry;
- responsive and flexible management schemes; and,
- improved data for better informed management.

The Task Force on Atlantic Fisheries of 1982 (The Kirby Task Force) proposed three objectives for all Atlantic fisheries, which were formally accepted by government:

- the industry should be economically viable;
- employment in the industry should be maximized subject to the condition that those employed receive a reasonable income; and,
- the industry should be Canadianized as much as possible.

These objectives provide a broad framework within which strategies and measures for the region's lobster fishery can be considered. The first objective calls for **Conservation-Economic** initiatives which aim at obtaining the greatest overall net benefit or wealth from the resource. The second and third objectives guide **Socio-Economic** initiatives which influence the distribution of those benefits among fishermen. The distinction between Conservation-Economic and Socio-Economic initiatives is worth clarifying further as a context for the study.



Conservation-Economic Effect

Exhibit 1.1

Conservation-Economic measures, (such as limits on capacity, fishing mortality or carapace size) strive to make the overall net benefit pie as big as possible (Exhibit 1.1). The **gross value pie** above represents the total landed value from the fishery. The **net benefit pie** is all income earned by owners, skippers, and crews after subtracting costs and expenses. Ideas and opportunities to increase the size of the pie can come from biological, economic, and market research and from the experiences of fishermen and the industry in general and may increase the gross value of the fishery and/or reduce fishing costs.

Socio-Economic Effect

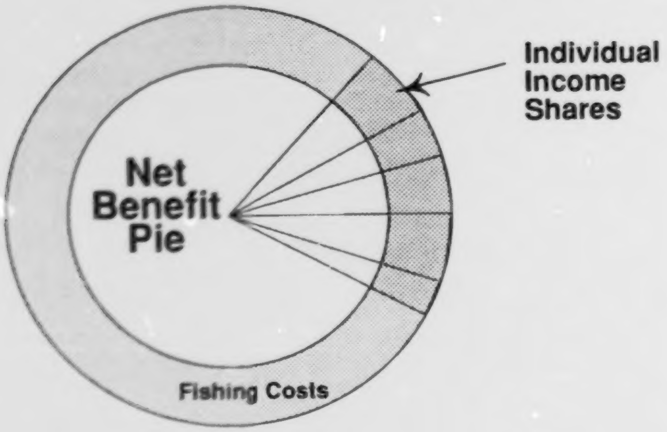


Exhibit 1.2

Socio-Economic measures, on the other hand, determine how the **net benefit pie** will be sliced up (Exhibit 1.2). Personal income levels and maximum employment are the primary considerations. Cultural and quality of life effects, meanwhile, must be considered when putting them into practice. Licensing is an example of a socio-economic measure. It is used to limit entry to the lobster fishery. Within that limitation, competitive fishing between licensed inshore fishermen establishes the share each individual receives.

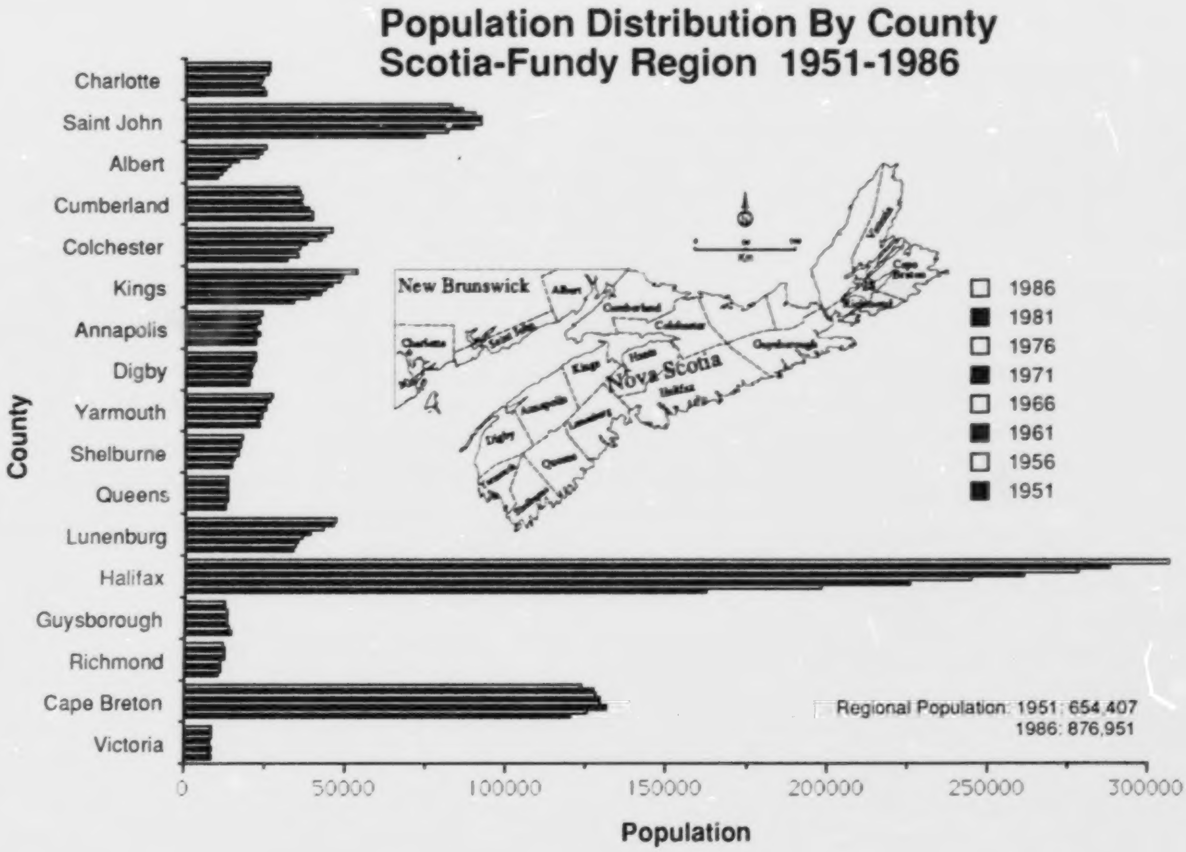
Conservation-Economic and **Socio-Economic** initiatives cannot be entirely separated, however. Negative interactions between the two must be taken into consideration. The most important interactions arise as a result of the common property nature of the fishery and the competition between fishermen. Since no individual fisherman can be assured he will receive the benefit from his own actions taken to enhance future catches, changes aimed at increasing the **net benefit pie** must be applied to all fishermen through effective regulation.

The distinction between the **Conservation-Economic** and **Socio-Economic** aspects of the fishery should be kept in mind while reading this report. It helps to isolate the issues and to identify how to achieve the most from this renewable resource in subsequent discussions.

2 REGIONAL CONTEXT OF THE FISHERY

2.1.1 Population Trends

Almost all of the primarily rural counties of Scotia-Fundy, including those where fishing is important, have retained a small population base over the last 35 years. More than half of the regional population is concentrated in three counties: Halifax, Cape Breton and Saint John. Halifax County is the only one that has shown a significant and steady population increase. The stability of population in other counties indicates net out-migration to growth areas such as Halifax. This reflects Halifax's role as a major maritime service centre for government, education, medicine and commerce. Exhibit 2.1 shows the distribution of the population at five-year intervals from 1951 to 1986.

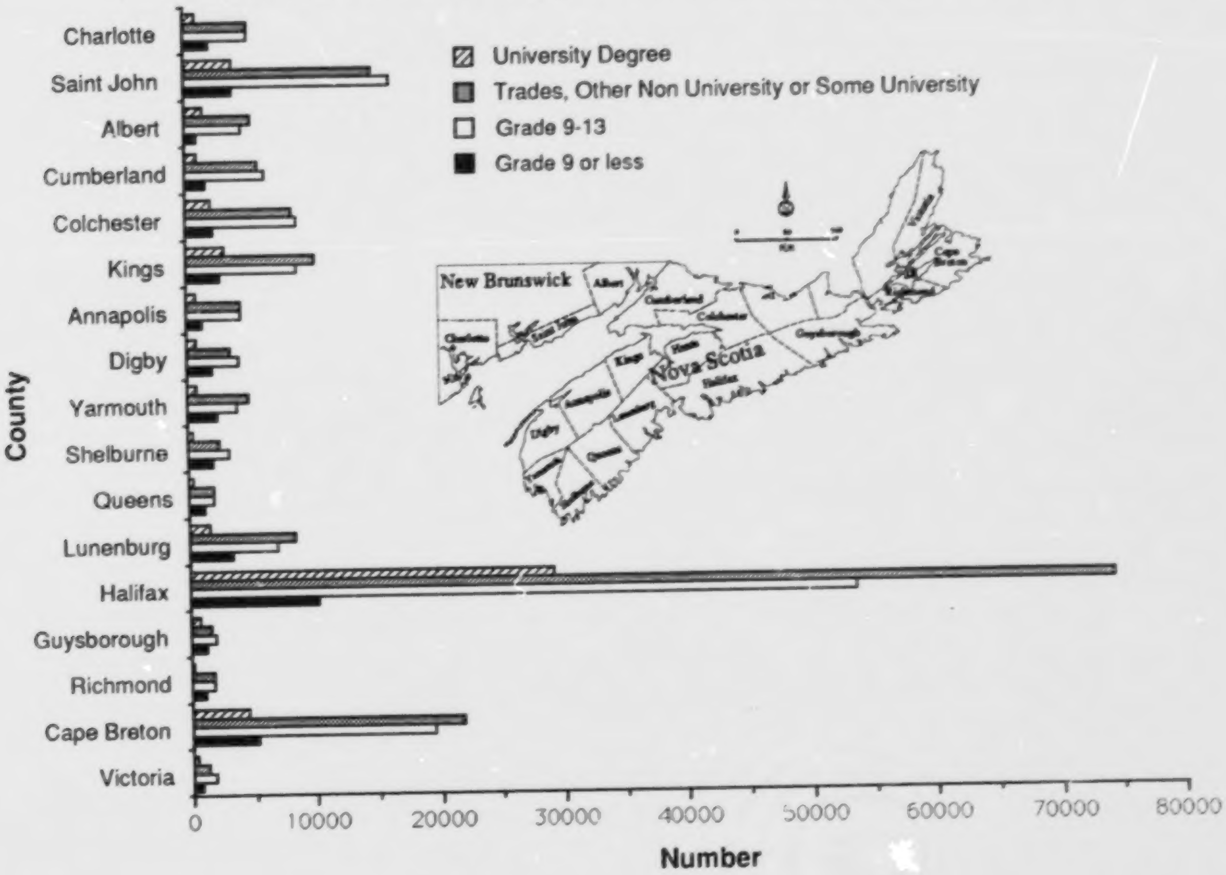


Population Distribution By County
Scotia-Fundy Region 1951-1986

Source: Statistics Canada, Census of Population, 1951-1986

Exhibit 2.1

Labour Force 15 Years and Older, By County Level of Schooling, Scotia-Fundy Region 1986



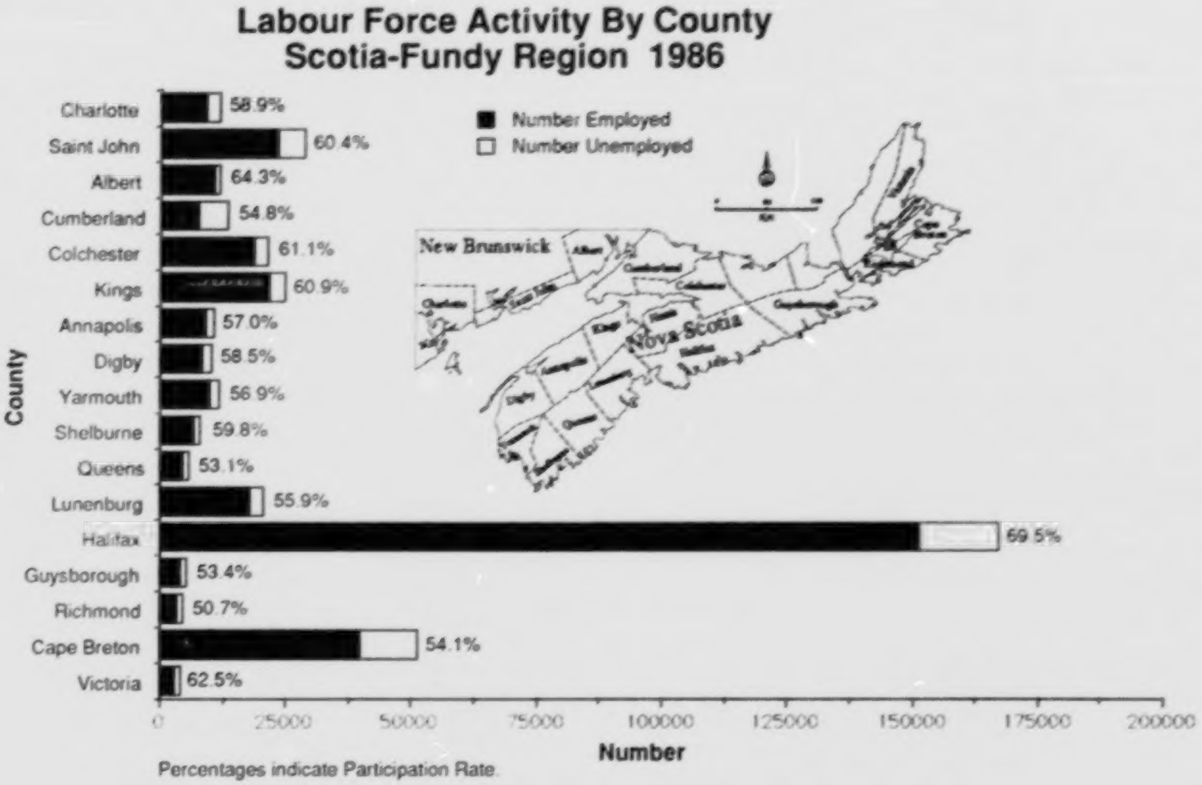
Source: Statistics Canada, Census of Population, 1986

Exhibit 2.2

Exhibit 2.2 shows that levels of education of the regional labour force are remarkably similar for all rural counties. The proportion of the labour force over the age of 15 with less than Grade 9 (the bar to the far left) is equal to or greater than those with university degrees (the bar to the far right) in all counties other than Halifax. The proportion with Grade 9-13 and that with trades or some university (the two centre bars) are about the same and significantly higher than the university category. Halifax County shows a high proportion in the university and trades categories.

2.1.2 Labour Force Characteristics

There were about 423,375 individuals in the Scotia-Fundy labour force in 1986. Exhibit 2.3 provides a profile of labour force activity by county. Not surprisingly, Halifax dominates because of its total population size, but another factor is also involved. The participation rate in Halifax County is the highest in the Region at 69.5%. The participation rate, which measures the portion of the population 15 years of age and over that is at work or seeking work, is indicated by county in Exhibit 2.3. The regional rate of 60% means that 6 out of 10 people of working age were working or looking for work in 1986. The rate in both eastern and southwestern Nova Scotia increased 5.5% between 1981 and 1986 and by 2% in southern New Brunswick. Male participation has stayed steady at around 70% between 1971 and 1986 but the female rate doubled to 46% during the same period. This means that twice as many women were working or looking for work in 1986 as in 1971.

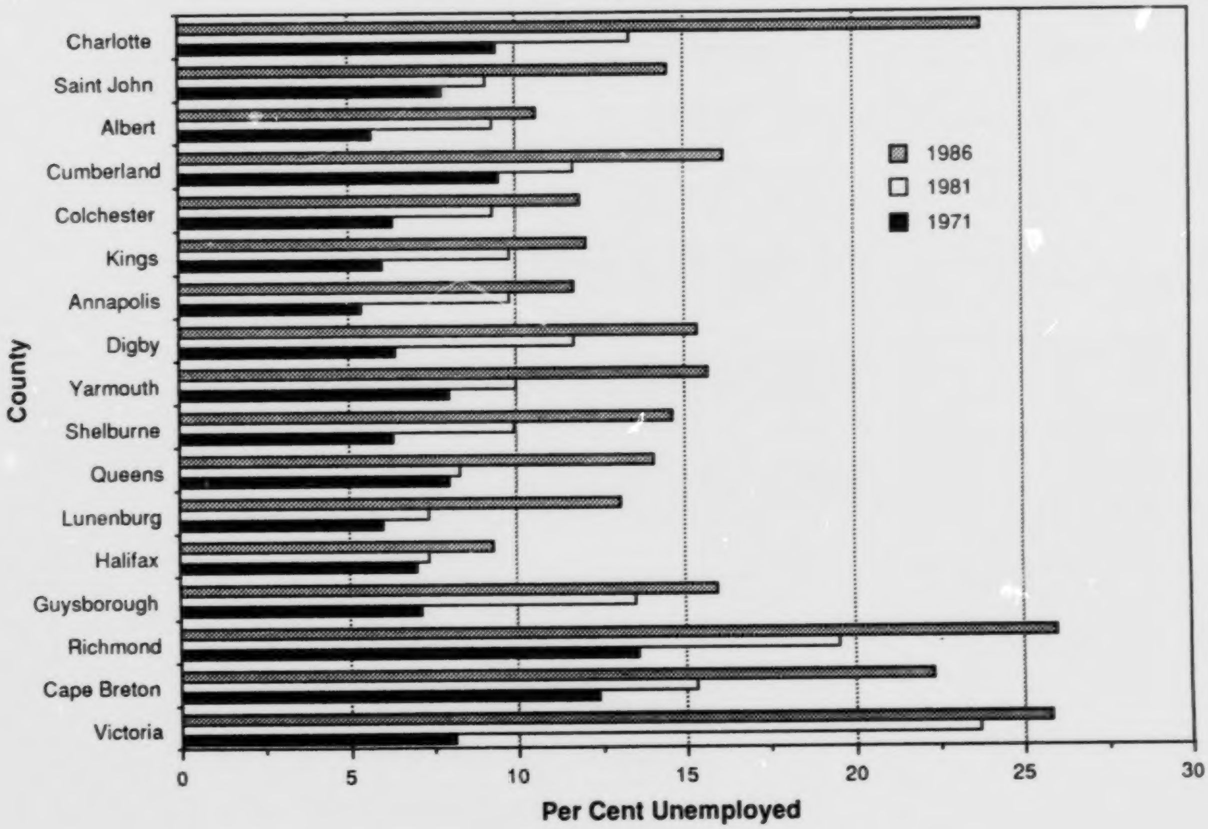


Source: Statistics Canada, Labour Force Survey, Cat. No. 71001

Exhibit 2.3

The regional unemployment rate in 1986 was 13.5%. An upward trend in unemployment by county is evident between 1971 and 1986, as shown in Exhibit 2.4. In 1986 the unemployment rate was highest in Cape Breton and Charlotte counties. Albert, Halifax, Annapolis, Colchester, Kings, and Lunenburg counties had relatively low rates of unemployment.

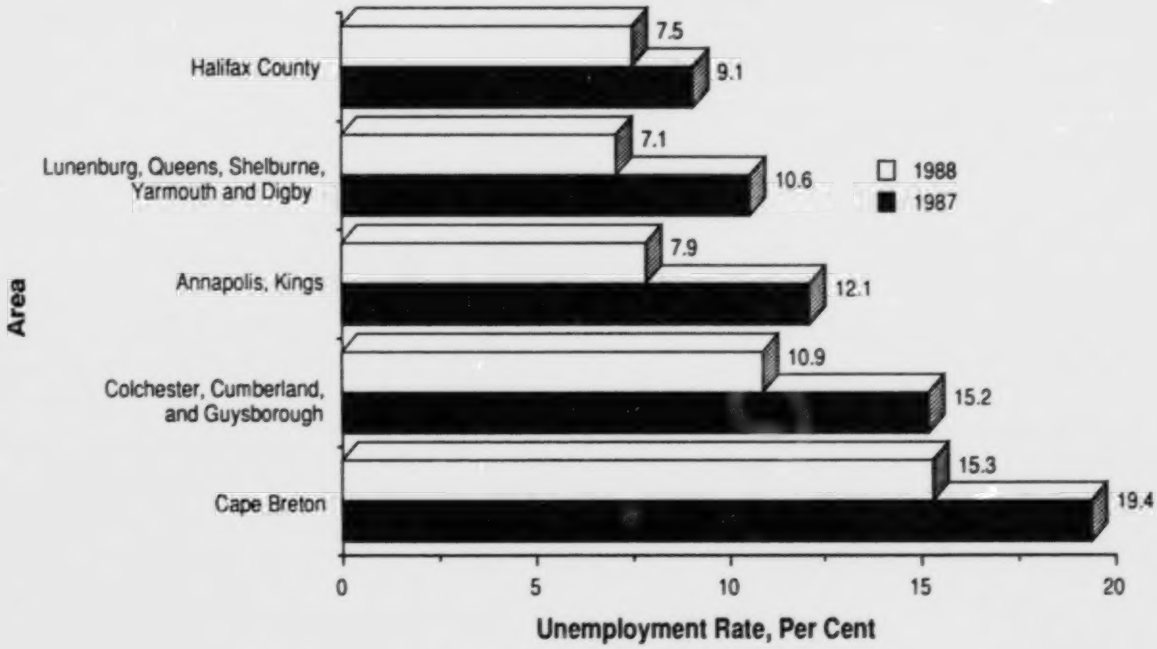
Unemployment Rate By County
Scotia-Fundy Region 1971, 1981, 1986



Source: Statistics Canada, Labour Force Survey, Cat. No. 71001

Exhibit 2.4

More recent statistics, unavailable at the county level, show a reversal of that trend in 1987 and 1988. The lowering trend is indicated in Exhibit 2.5.



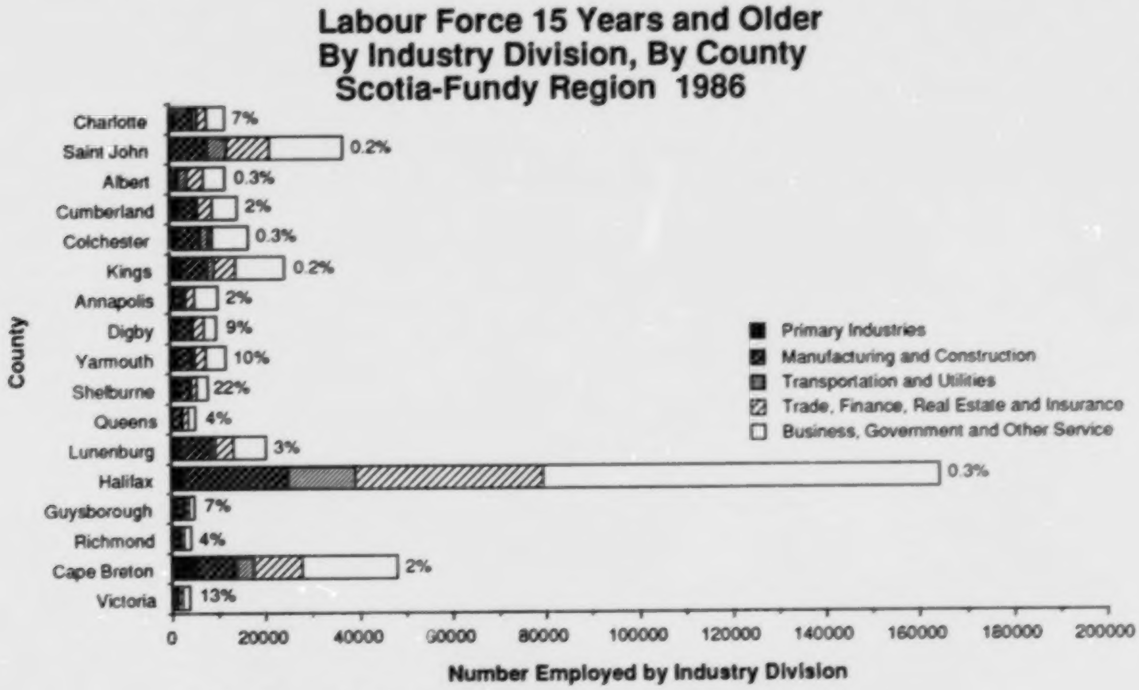
Unemployment Rate Update For Selected Maritime Areas 1987 – 1988

Source: Statistics Canada, Labour Force Survey, Cat. No. 71001

Exhibit 2.5

2.1.3 Employment Characteristics

Most industrial, high tech and other specialized industries are concentrated in cities and towns. The distribution of the regional labour force among major industry divisions is presented in Exhibit 2.6. Fishing, which is shown with other primary industries, accounted for a very small proportion of total employment in all industries in 1986 at 2.1% (although it is up from 1.7% in 1971). This represents about 9,000 fishing jobs. Approximately 14,000 people had a personal licence for commercial fishing in Scotia-Fundy in 1986. Some of the 5,000 individuals not accounted for by Statistics Canada were simply not fishing. Others worked in the fishery part-time, although the actual numbers are difficult to estimate from available data. Fish processing, included in the manufacturing and construction group, provides employment for an estimated 12,000 people. Employment in both fishing and processing amounted to about 5% of the regional workforce. In addition, the fishing industry stimulates employment in transportation, trade, and in the business and services sectors.



Labour Force 15 Years and Older By Industry Division, By County Scotia-Fundy Region 1986

Per Cent Figures Indicate Percentage of County Labour Force in Fishing
Total Regional Labour Force : 423,330
Total (Skippers and Crew) in Fishing : 2.1%

Source: Statistics Canada, Census of Population 1986

Exhibit 2.6

The percentages shown in the exhibit for each county represent the portion of the workforce which was engaged in fishing according to Statistics Canada. The Shelburne County work force has the highest proportion of fishing jobs at 22%. Yarmouth, Digby, Victoria, Guysborough and Charlotte counties also have a relatively high dependence on fishing.

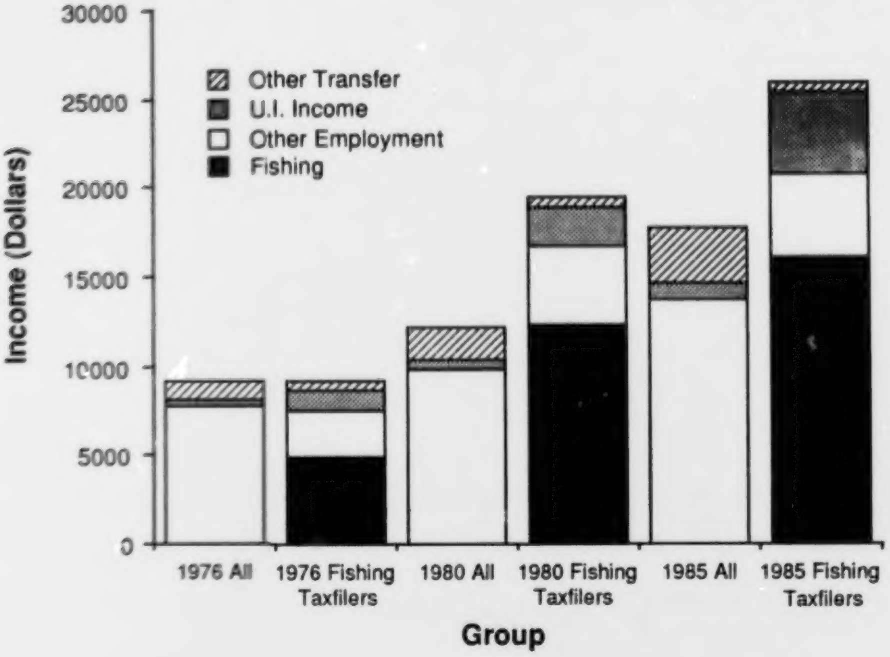
2.1.4 Relation Between Income and Employment

Statistics Canada reports data on net taxable earnings from tax files which can be used to compare trends in income levels over time. In 1976, the average total income of taxfilers in Scotia-Fundy from all sources was slightly higher than the average total income of the 8,200 taxfilers who reported fishing income, (Exhibit 2.7). *The "fishermen" category includes individuals reporting income from any species, not only lobster.* By 1985, average income for all taxfilers was not quite double its 1976 level, but the average for fishermen taxfilers had almost tripled. The largest gain was made between 1976 and 1980 but fishermen continued to perform well throughout the period. (More recent data were unavailable for this analysis).

Income from employment made up 84% of the average income reported for all taxfilers in 1976 but only 78% in 1985. Unemployment Insurance benefits have remained almost constant while other transfer payments including family allowance, Canada Pension, and other benefits reported to Revenue Canada have increased by 5%.

The portion of income which fishermen taxfilers received from fishing increased from 54% to 62% between 1976 and 1985 while income from other types of employment decreased from 28% to 18%. Unemployment insurance increased by 5% while other transfers decreased by 3% resulting in a small overall increase in the transfer portion of income. Regional averages for all taxfilers in Exhibit 2.7 include individuals who are totally dependent on transfer payments. They also combine urban and rural taxfilers. This treatment of the data consequently compares trends on a very broad basis.

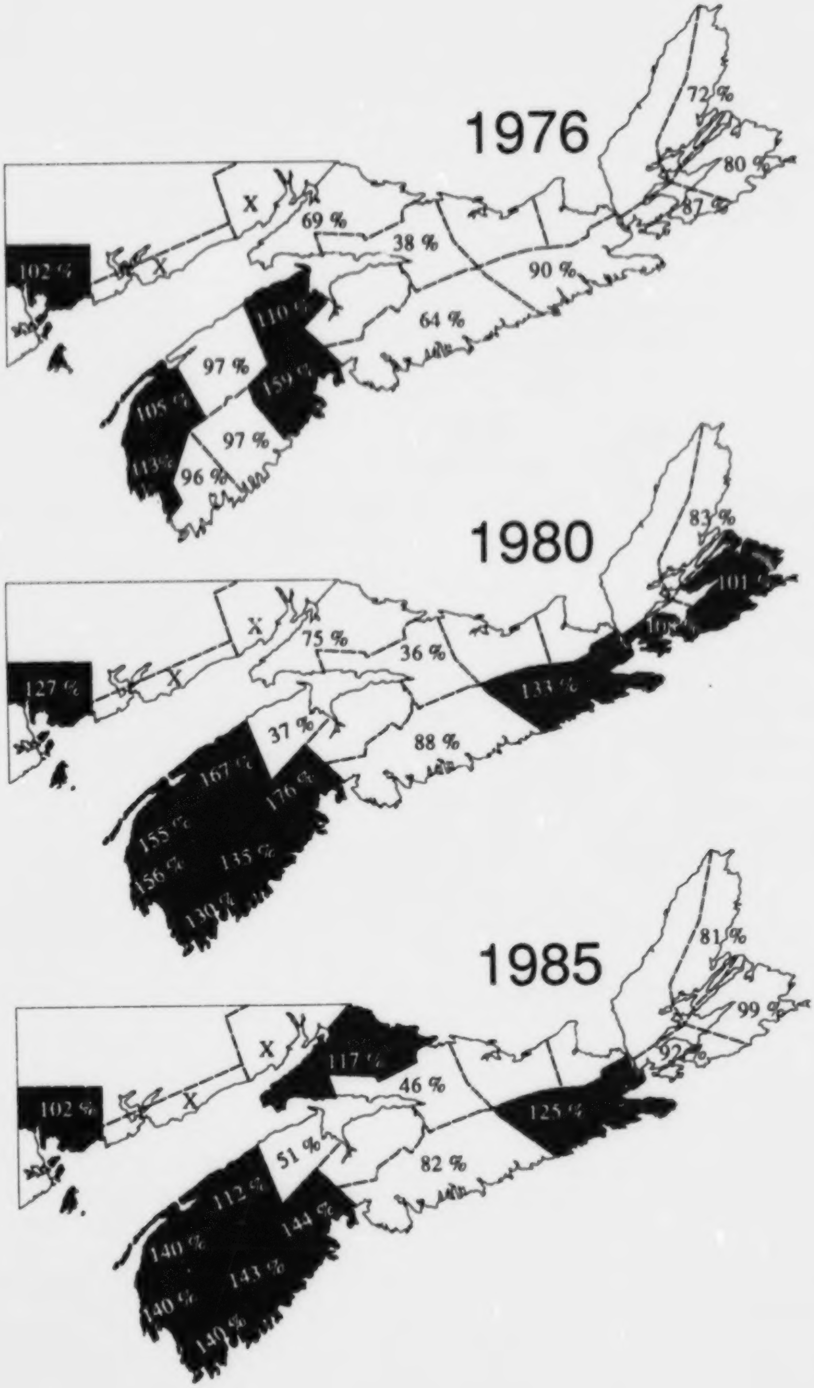
Income Profile for Taxfilers Reporting Fishing Income and for all Taxfilers: Scotia-Fundy Region



Source: Statistics Canada, Tax Data Process 1976, 1980, 1985.

Exhibit 2.7

A more direct comparison is possible at the county level between taxfilers reporting fishing income and the earned income of the total taxfiler population, i.e., excluding transfer income. The results comparing only earned income are shown in Exhibit 2.8 for 1976, 1980 and 1985. The shaded areas represent counties where fishermen taxfilers outperform the county average earned income. A value of 125 indicates that fishermen incomes were 25% higher than the county average, a value of 90 indicates they were 10% lower. Fishermen taxfilers outperformed the average in 5 of 15 counties in 1976, 10 of 15 in 1980, and 9 of 15 in 1985. Data were unavailable at the county level in Albert and Saint John counties to ensure confidentiality to a smaller number of filers. Between 1976 and 1985, fishermen taxfilers improved their standing relative to the county average in all but Kings and Lunenburg counties.


1976
72 %
80 %
87 %
X
69 %
38 %
102 %
X
90 %
110 %
64 %
97 %
159 %
105 %
97 %
113 %
96 %
1980
83 %
101 %
X
75 %
36 %
127 %
X
133 %
37 %
88 %
167 %
176 %
155 %
156 %
135 %
130 %
1985
81 %
99 %
92 %
X
117 %
46 %
102 %
X
125 %
51 %
82 %
112 %
144 %
140 %
143 %
140 %
140 %

Average employment income of fishermen taxfilers as a percentage of the average employment income of all taxfilers in the Scotia-Fundy Region

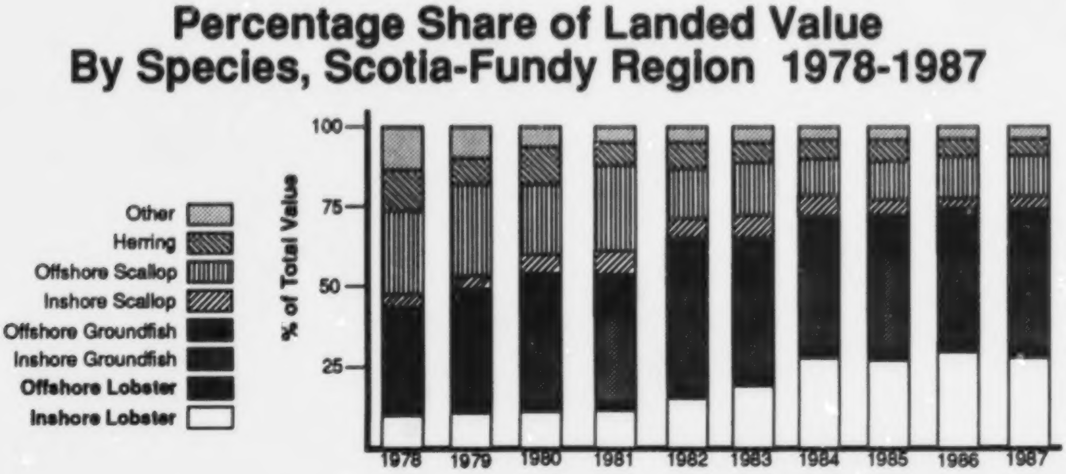
Source: Statistics Canada, Tax Data Process, 1976, 1980, 1985

Exhibit 2.8

2.2 Overall Fishery Characteristics

Higher incomes for a greater number of fishermen were made possible by large increases in the value of the fishery. By 1987, the landed value of the fishery had increased to $502 million from $202 million in 1978. This would be equivalent to $353 million in 1987 dollars adjusted for inflation.

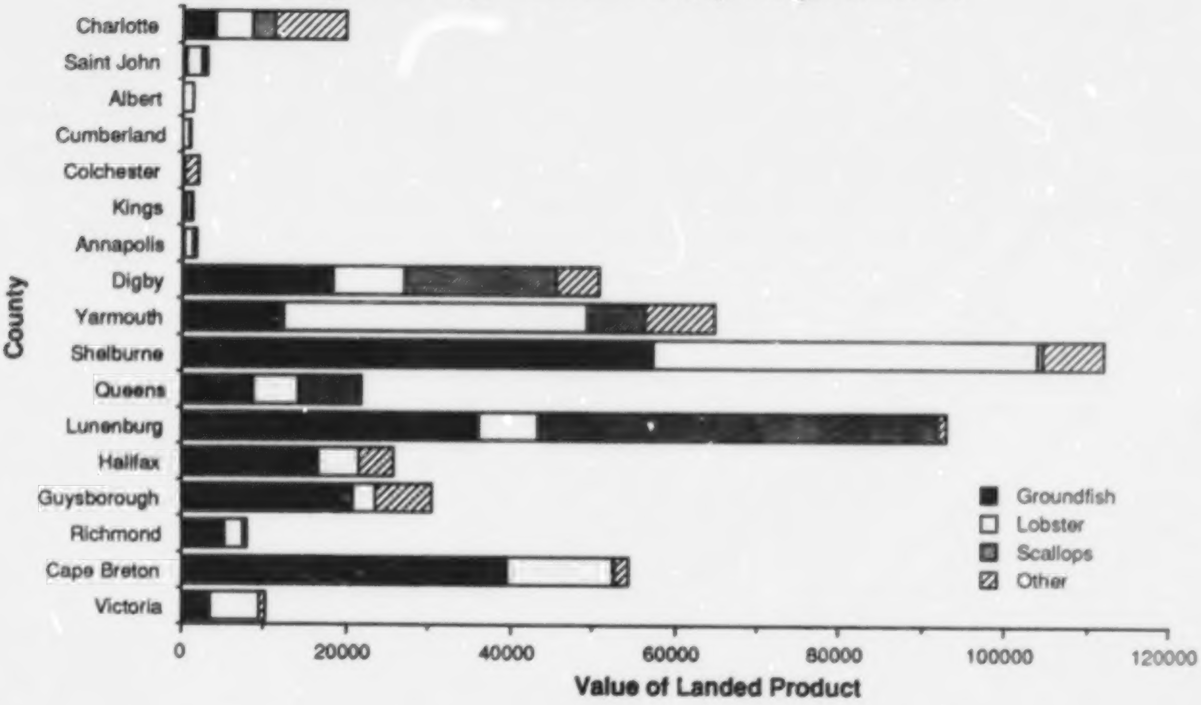
And while the value was increasing, the mix of species landed was changing, as was the distribution between "inshore" and "offshore". Exhibit 2.9 presents the changes in percentage terms for the last 10 years. In 1978, inshore lobster (14%), groundfish (17%), and scallops (4%), combined for 35% of total landed value. Offshore groundfish and scallops accounted for 40%, offshore lobster less than 1%, herring 13%, and all other fisheries 12% of total landed value. A steady increase has occurred in relative shares of inshore lobster and groundfish compared to all other groups since 1978. By 1987, inshore lobster 28%, and inshore groundfish 34%, had doubled their relative share of the total value of landings; offshore lobster remained below 1%.


Percentage Share of Landed Value By Species, Scotia-Fundy Region 1978-1987

Source: Fisheries and Oceans, Scotia-Fundy Region.

Exhibit 2.9

The value of the fishery and the species mix, by county, is illustrated in Exhibit 2.10. Counties in the upper Bay of Fundy, which have the lowest landings, have the smallest circles. [Note: Only Bay of Fundy landings are shown for Cumberland and Colchester Counties.] The bar segments show the proportion of groundfish, lobster, scallops and other species by landed value. Lobster contributes 25% or more of the landed value in 11 of 17 counties and more than half of the landed value in Yarmouth and Victoria counties. Shelburne County has the highest landed value for lobster.


Landed Value, By Major Species Category, By County, Scotia-Fundy Region 1987

Source: Fisheries and Oceans, Scotia-Fundy Region, Statistics Division, 1978-1987.

Exhibit 2.10

2.2.1 Distribution of Lobster Income within Counties

During 1987, lobster was landed in 310 ports in Scotia-Fundy and lobster licence holders resided in 389 communities. The total number of communities per county in which licence holders reside is shown in Exhibit 2.11. Each community is placed in one of five categories based on the total value of lobster landings by all fishermen residing in the community. Halifax County has the most communities where fishermen live (66) but because total county value is relatively low, it also has the highest number of communities in the lowest income categories. Shelburne has 45 communities, 10 of which are in the over $1 million category. More than 60% of the communities in the Region have total values under $100,000.

Communities of Residence of Lobster Fishermen by County, Scotia-Fundy Region – 1987

County	Category					Total
	Less Than $10,000	$10,000 to $99,999	$100,000 to $499,999	$500,000 to $999,999	$1,000,000+	
Victoria	2	9	9	1	1	22
Cape Breton	4	8	7	5	2	26
Richmond	2	16	3			21
Guysborough	7	26	2			35
Halifax	10	48	8			66
Lunenburg	7	18	16	2		43
Queens	3	1	7	1	1	13
Shelburne	6	15	6	8	10	45
Yarmouth	1	7	13	4	11	36
Digby		6	7	4	2	19
Annapolis	2	3	3			8
Kings		4				4
Colchester		1	1			2
Cumberland	1	2	2			5
Charlotte	3	21	3	3		30
Saint John	3	6	1	1		11
Albert		2	1			3
TOTAL	**51**	**193**	**89**	**29**	**27**	**389**

Source: Fisheries and Oceans, Scotia-Fundy Region, Statistics Division, 1987

Exhibit 2.11

These figures provide one perspective on the distribution of the benefits from the lobster fishery between communities. No records are maintained which identify crew members on lobster boats in a systematic way, or keep track of where they live. The table relates to gross landed value. Fishermen's expenses are not taken into account but the port of landing would in most instances be where they service and provision their vessels, generating spin-off jobs and secondary economic benefits. The vessels themselves, electronic equipment, and other gear may be purchased in more distant communities. While the fishery most directly affects the communities where fishing occurs, benefits are generated throughout the region.

3 Lobster Biology and Ecology

3.1.1 Background and Life Cycle

The American lobster *Homarus americanus*, lives in coastal waters ranging from New Jersey to Newfoundland and offshore along the outer continental shelf from Virginia to Sable Island. Like crabs, crayfish, and shrimp, lobsters are crustaceans. They have an external skeleton or shell, called an exoskeleton, made of chitin, a protein, and minerals, mainly calcium. In order for the lobster to grow, the shell must be shed – a process called molting – and replaced by a new one, formed beneath the old. The new shell is soft and the lobster expands to its new, larger size before it hardens.

Adult lobsters usually mate within hours of the female molt, although scientists have reported females breeding in the hard-shell state. The female excretes pheromone, a chemical that attracts and pacifies the male. During mating, sperm are transferred to a receptacle on the female where they are stored for 10-13 months. Fertilization of eggs occurs the following summer, when they are passed to the outside. This process of egg extrusion occurs mainly in July and August. The fertilized eggs are incubated on the underside of the tail for 10-12 months.

Sexually mature females, of the size commonly observed in the inshore fishery, molt and thus produce eggs in alternate years. Large females, greater than 1 kg, appear to molt only once every 3 to 5 years. However, they have the ability to store sperm for more than one year. The number of eggs produced increases with the size of the female (Exhibit 3.1).

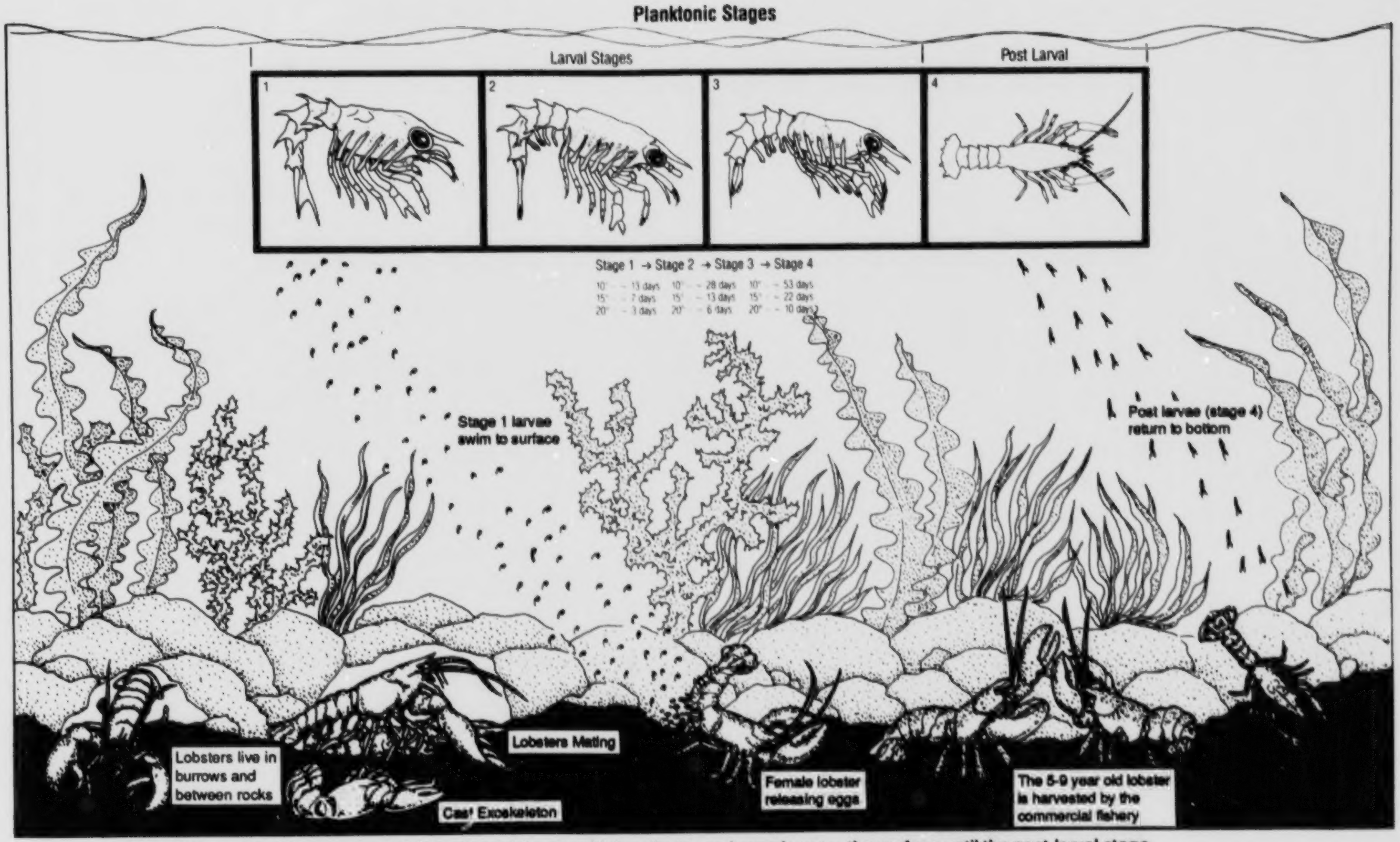
MEAN NUMBER OF EGGS PRODUCED BY FEMALES OF DIFFERENT SIZES

Carapace length of female	Number of eggs
80 mm (3.2")	7,600
90 mm (3.6")	11,600
100 mm (4.0")	16,000
140 mm (5.6")	49,500
160 mm (6.4")	7,400

Exhibit 3.1

Between July and August the eggs hatch into free-swimming larvae (Exhibit 3.2). The term larvae is used because the young do not resemble adult lobsters. Lobster larvae live near the surface. The duration of each of the three larval stages is related to water temperature (Exhibit 3.3): the warmer the water, the faster the development to the postlarval stage. Marine scientists have noted that larvae produced late in the season may not have sufficient time to develop. During cold water years this may be an important cause of natural mortality. Similarly, during warm water years the larvae may develop faster and have higher survival rates.

During the post larval stage, or first juvenile stage, the lobster settles to the bottom, seeks a suitable bottom type and burrows rapidly under stones, shells, etc. Laboratory experiments have shown that early stage juveniles prefer a gravel bottom to silt-clay over gravel. Juvenile lobsters of less than 45 mm (1.8") carapace length remain in their shelter or move only short distances from it. These lobsters are rarely seen in lobster traps and little is known about their growth, behavior or ecology. Laboratory data suggest that lobsters molt 9-12 times during their first year and 9 times over the next 3-6 years.


Planktonic Stages
Larval Stages
Post Larval
1
2
3
4
Stage 1 → Stage 2 → Stage 3 → Stage 4
10° – 13 days 10° – 28 days 10° – 53 days
15° – 7 days 15° – 13 days 15° – 22 days
20° – 3 days 20° – 6 days 20° – 10 days
Stage 1 larvae swim to surface
Post larvae (stage 4) return to bottom
Lobsters live in burrows and between rocks
Lobsters Mating
Cast Exoskeleton
Female lobster releasing eggs
The 5-9 year old lobster is harvested by the commercial fishery

Lobster life cycle: Mature eggs hatch to stage 1 larvae which swim to, and remain near, the surface until the post-larval stage (stage 4) is reached. The time required to reach the post-larval stage is given for certain temperatures. Post-larvae settle to the bottom as juveniles and take from 5-9 years to reach legal harvestable size. Females take a similar amount of time to reach sexual maturity. Males protect females in burrows, where mating occurs immediately after the female molts. Eggs hatch about two year after mating.

Exhibit 3.2

APPROXIMATE NUMBER OF DAYS REQUIRED TO PASS THROUGH EACH LARVAL STAGE AT DIFFERENT TEMPERATURES

TEMPERATURE (C°)	DAYS PER LARVAL STAGE			
	1	2	3	4
8	20	26	42	
10	14	15	25	49
12	10	11	15	32
14	7	8	11	25
16	5	6	9	22
18	3	5	7	18

Exhibit 3.3

In much of the Scotia-Fundy Region, lobsters reach the minimum legal size of 81 mm (3 3/16") at age 5-8 yrs, though it may be longer in areas of colder water such as the Bay of Fundy. Most lobster in this Region reach the fishery's minimum legal size prior to sexual maturity. Time to attain sexual maturity, like larval development, is a function of water temperature; it may take up to 10 yrs in cold water, and as low as 5 yrs in warm water. Females are considered to be mature when they are capable of extruding eggs. The size at which 50% of the females reach maturity ranges from 75 mm (3"), in northeastern Cape Breton Lobster Fishing Area (LFA) 27, to over 105 mm (4.2"), in parts of the Bay of Fundy. Males mature at a smaller size than females, but small males tend not to mate with larger females.

3.1.2 Distribution and Ecology

Lobsters occur in commercial numbers along most of the Scotia-Fundy coast. Inshore fishing is concentrated in depths less than 35 m, but extends to depths of 90 m or more in some areas. Yields vary greatly from area to area. A study done in 1985 found that along the open coast of eastern Nova Scotia, commercial yields per bottom area fished ranged between 82 kg/km² in LFA 32 and 1,249 kg/km² in LFA 27. Few direct measurements of the number of lobsters per unit area of bottom are available. However, where lobster densities appear low, such as along Nova Scotia's eastern shore, the availability of good lobster bottom is not the limiting factor.

Lobsters can live on a variety of bottom types. They are found on combinations of mud/silt, mud/rock, sand/rock and bedrock/rock. The most common, near-shore habitat is a rugged topography of rock and boulders overlying sand. Frequently, in depths less than 15 m, lobsters are found among a number of species of large seaweed. The importance of this relationship has not been determined, but research has found little evidence to support the popular concept that lobsters require seaweeds. Many other species share the environment with lobsters in inshore waters.

Until a few years ago little was known about the distribution of juveniles. Studies near Shelburne, Nova Scotia, and off Iles de la Madeline, Quebec, indicate that juvenile lobsters are most numerous on shallow rocky bottoms, with low densities occurring on sand covered with eel grass. Juvenile lobsters were not found resident on bare sand.

Lobsters are also found in the offshore areas along the outer shelf and upper slope of the Scotian Shelf west of Banquereau Bank, on Georges Bank, and in the deep basins of the Gulf of Maine. Here they are commercially fished to depths of 450 m and have been observed to depths of 700 m; density is much lower than on near-shore grounds. A 1980 study found that lobster densities on the continental slope were generally less than 0.1% of average coastal areas. Even the rich offshore canyons have densities less than 5.0% that of coastal areas. Offshore lobsters have been observed in burrows, dug into the canyon walls, in abandoned lobster traps and more generally in shallow, dish-shaped depressions, excavated on open sand or gravel bottom.

There are considerable differences in the average size of animals caught in different areas. Lobsters in such warm-water areas as the southern Gulf of St. Lawrence grow faster and mature at a smaller size than those of cold water areas like the Bay of Fundy. In recognition of this, the legal carapace length is 63.5 mm (2.5") and 69.5 mm (2.75") in the southern Gulf of St. Lawrence and LFA 27, respectively, and 81 mm (3 3/16") for most of Scotia-Fundy.

Marked differences in lobster size can also occur between adjacent grounds. For example, trap-caught lobsters on the north side of Grand Manan are significantly larger than on the south side. These differences may be due in part to the more recent exploitation of the large animals in the deep water fishing sites where they overwinter. Similarly the large size of offshore lobsters may be due in part to the short history of their exploitation. The small size of coastal lobsters is largely the result of heavy fishing pressure which removes the majority of lobsters before they reach maturity. In the early days of the fishery (1890-1900) lobsters averaged 0.9-1.3 kg (2-3 lb), similar to the present offshore areas. In southern New England, where offshore stocks have been subjected to heavy fishing for 35 years, the average size of lobsters is now similar to that of coastal regions.

3.1.3 Movement of Juveniles and Adults

Juvenile lobsters of less than 45 mm carapace length are seldom seen outside their shelters and movements in laboratory experiments are restricted to a few metres. The distance travelled by lobsters larger than 60 mm has been estimated by releasing tagged lobsters and recording the location and time of recapture. During the 1940's and 1950's, 27,500 tagged lobsters were released in Gabarus, Fourchu, and L'Archeveque, N.S. Over 15,000 were recaptured; 2,000 were at large for over a year. No movement was observed between the Gabarus-Fourchu and L'Archeveque fishing grounds, a distance of only 6.4 km (4 miles) and no recaptures were made more than a few kilometers from release sites.

Recent tagging studies in the Gulf of Maine indicate that mature lobsters move considerably farther than immature ones, and that long-distance movement (greater than 100 km) allows some interchange of lobsters between the Bay of Fundy, Gulf of Maine, and the adjoining continental shelf. Many mature lobsters make seasonal migrations into shallow, warm water on the offshore banks or in coastal regions, during summer-fall, and into deeper water during winter-spring. Higher temperatures in these locations give the necessary warmth, measured in degree-days, for molting, growth and egg development. Berried females hatching eggs in relatively warm, shallow coastal or bank waters may provide a survival advantage to their larvae by decreasing the time spent in the water column before moving to the bottom-dwelling stage.

Tagging studies have shown that many lobsters make round-trip migrations of 10-40 km in 1 year. The distance depends on bottom conditions. These seasonal migrations explain some of the long-distance and short-distance movements observed. Although lobsters may return to the same location year after year, not all do. Over many years, some mixing of mature lobsters probably occurs along the continental shelf area.

Seasonal migrations by mature lobsters have several implications for lobster fishery management in the Scotia-Fundy Region. It affects both our ability to determine stock structure (how many stocks are there?) and to estimate their sizes. The movement of mature lobsters to shallow water during summer, when the fishing season is closed, protects these lobsters from exploitation. Mature females tend to move to deeper water earlier in the fall than mature males. The males are thus more vulnerable to the early fall fishery of the Bay of Fundy.

The relationship between larval abundance and the subsequent abundance of legal lobsters has been examined in Northumberland Strait. Only weak correlations were found between abundance of both early and late stage larvae, and the number of legal lobsters in the area about 6 yrs later (lobsters grow to legal size in about 6 yrs in this area). The long larval period has led to the hypothesis that the larval stages are subject to considerable transport. It has been estimated that larvae could drift up to 160 km on the eastern shore of Nova Scotia before settling to the bottom, and that larvae hatched on Browns Bank could settle in coastal Nova Scotia or Maine. However, recent observations of lobster larval behavior suggests that long-distance transport of larvae may not be that extensive.

The question of whether catching lobsters offshore reduces the catch inshore is of great interest. The available information suggests little relationship between lobsters on the outer edge of the Scotian Shelf, and the inshore areas from LFA 29 in Cape Breton to LFA 33 in Queens County (Exhibit 3.4). During the last 10 yrs, over 6,000 lobsters throughout eastern Nova Scotia were marked with sphyrion tags, which are retained through a number of molts. Of approximately 1,400 tagged lobsters recaptured, only two were caught more than 15 miles from their release site. Also, Department groundfish trawl surveys between 1970 and 1982 indicate an absence of lobsters between the inshore and offshore grounds. The outer shelf from LaHave Bank to Banquereau yielded sparse catches, and practically no lobsters were caught between the outer shelf and the 50 fathom contour, the inner boundary of the surveys. A single survey for lobster larvae in 1977 over the same area as the trawl surveys found larvae at 5 of 15 stations between LaHave and Western Banks, but none at 37 stations distributed over the remainder of the area outside the 50 fathom contour. More data on distribution, abundance, and stock structure in this area is required.

The exchange of lobsters between inshore and offshore areas in southwest Nova Scotia is greater than between the outer Scotian Shelf and inshore areas of Nova Scotia's eastern and southern shores. However, in spite of more data for southwest Nova Scotia, the importance of this exchange to the inshore fishery is still unknown. The distribution of lobsters is continuous from the inshore to the midshore (German Bank to Lurcher Shoal), and the distribution among offshore areas (east and south of Brown's Bank, Fundian Channel, Crowell Basin) is also nearly continuous (Exhibit 3.4). Lobsters are less abundant between German Bank and Browns Bank, but tagged animals do cross this channel. Lobster larvae are distributed more or less continuously over the inshore and offshore in the southwest Nova area. Berried females have also been found throughout the area. They have only recently been found inshore as a result of experimental fishing during the summer. Extensive tagging has shown movements among offshore areas, among inshore areas, and from the inshore and midshore to certain offshore grounds, but seldom from the offshore to midshore or the offshore to inshore. These results may be biased in favour of showing offshore movement however, because offshore fishermen are more likely to return tags than are the inshore fishermen in southwest Nova Scotia. Improved cooperation from these inshore fishermen is needed to establish with greater certainty the movement between inshore, midshore, and offshore grounds.

Lobsters are fished throughout the Bay of Fundy, but 90% of the landings are from the lower Bay. Although most of the large sexually mature lobsters tagged in the Bay were recaptured in the Bay, many were recovered by the Maine coastal fishery, and a few were recovered by the offshore fishery in the Gulf of Maine. None were recovered along the Nova Scotia coast outside the Bay of Fundy. Immature lobsters were much more likely to remain within the Bay. None of the more than 15,000 mature lobsters tagged in offshore areas and few of the lobsters tagged on the Maine coast have been recovered within the Bay. Thus the offshore fishery has far less direct impact on the Bay of Fundy spawning stock than the inshore fishery because offshore lobsters rarely migrate into the Bay and the large majority of mature lobsters that mature within the Bay are caught within the Bay.

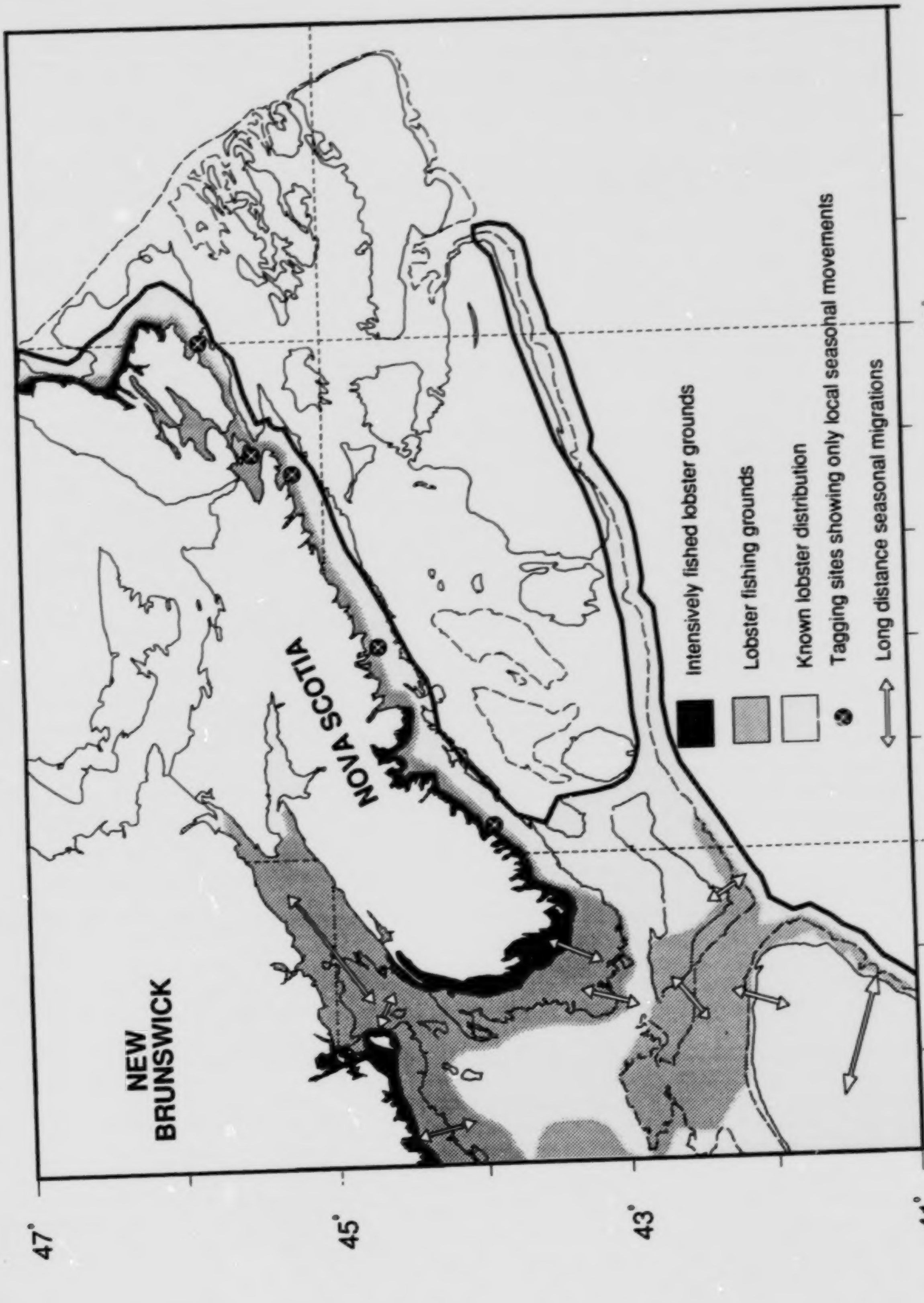

NEW BRUNSWICK
NOVA SCOTIA
■ Intensively fished lobster grounds
▨ Lobster fishing grounds
☐ Known lobster distribution
⊗ Tagging sites showing only local seasonal movements
⇕ Long distance seasonal migrations
60°
65°
47°
45°
43°
41°

Exhibit 3.4

3.1.4 Growth

Lobster growth is described as discontinuous because it only occurs at the molt. The annual growth rate is dependent on the number of molts per year and the increase in size per molt. The highest growth rates occur during the first year of life, when the time between molts is the shortest. A lobster reaches legal size after 15 to 20 molts. Lobsters around legal size (70-90 mm) generally molt annually, increasing in length by 15% and in weight by 40-55%. While the percentage increase in length per molt remains relatively constant with increasing size, the annual growth rate slows after sexual maturity because the molt occurs less frequently.

The maximum sizes recorded for lobsters are 260 mm (10.4") carapace length (38.6 lb) for a male and 216 mm (8.6") carapace length (16.4 lb) for a female. It is not yet possible to determine the exact age of lobsters because the hard parts by which they are aged are lost with each molt.

3.1.5 Natural and Fishing Mortality

Lobster populations are subjected to natural mortality (death due to disease, injuries and predation), and fishing mortality (lobsters caught by fishing). Natural mortality is thought to be highest during the egg and larval stages, and lowest following sexual maturity. Fishing mortality appears to be the dominant factor controlling the population of legal-sized lobsters. Estimates of lobster mortality rates are difficult to obtain because of their discontinuous growth pattern and the lack of any accurate method to age lobsters in the wild.

Estimates of egg mortality during the 10-12 month incubation period vary from 36% to 54%. Some lobsters may lose all their eggs. Mortality during the larval phase has been estimated to range from 97.5 to 99.5%. Annual natural mortality rates in adult lobsters are not known, but are believed to be low. Estimates vary from 2% to 30% though the higher estimates are considered less reliable. The values of 5% mortality for non-molting animals and an additional 5-10% for molting animals are commonly used.

The exploitation rate is the annual percentage of legal-sized lobsters caught by the fishery and lost to natural mortality. Recent estimates of this rate range from 35% in LFA 35 to 83% in LFA 27 and 34. Estimates in the offshore fishery range from 10-40%.

3.1.6 Food

The food of juvenile and adult lobsters is located primarily by smell rather than sight. They catch live animal prey such as crabs, mussels, sea urchins, marine worms, periwinkles, sea stars and fish, scavenge dead and decaying animal matter and consume seaweeds. Feeding activity is greater at high water temperatures and during the period following a molt. Feeding is believed to stop when water temperatures drop below approximately 3°C. Larval lobsters have been raised in the laboratory on diets of live copepods (small crustaceans) and brine shrimp, but little is known of their natural diet.

3.2 Stock-Recruitment Relationships

"Stock-recruitment relationships" are relationships between the weight or number of females spawning in a year (stock size) and the number of their offspring that reach legal size (recruitment). A stock is that portion of a fish population which is managed as a separate unit. Scientists believe that stock size and subsequent recruitment do not have a simple relationship. Therefore, doubling the number of spawners will not necessarily double the number of recruits. However, when abundance is low, recruitment might more than double if spawner numbers double. Interestingly, recruitment may not increase (and may even decrease) if spawners are increased above a certain high level. It is not known for any of our lobster stocks how many spawners are needed to produce a large number of recruits for the fishery.

Data on the number of spawners in successive years do not exist, but many years of annual landings data are available. The high landings of recent years were obtained from offspring hatched when catches were at near record lows. The most extreme cases were for Queens and Lunenburg counties in LFA 33, where 1986 and 1987 landings were the highest in over 75 years, while in the late 1970's when these lobsters were spawned, landings were near the lowest record levels. This suggests that the number of spawners is not the sole factor limiting lobster recruitment.

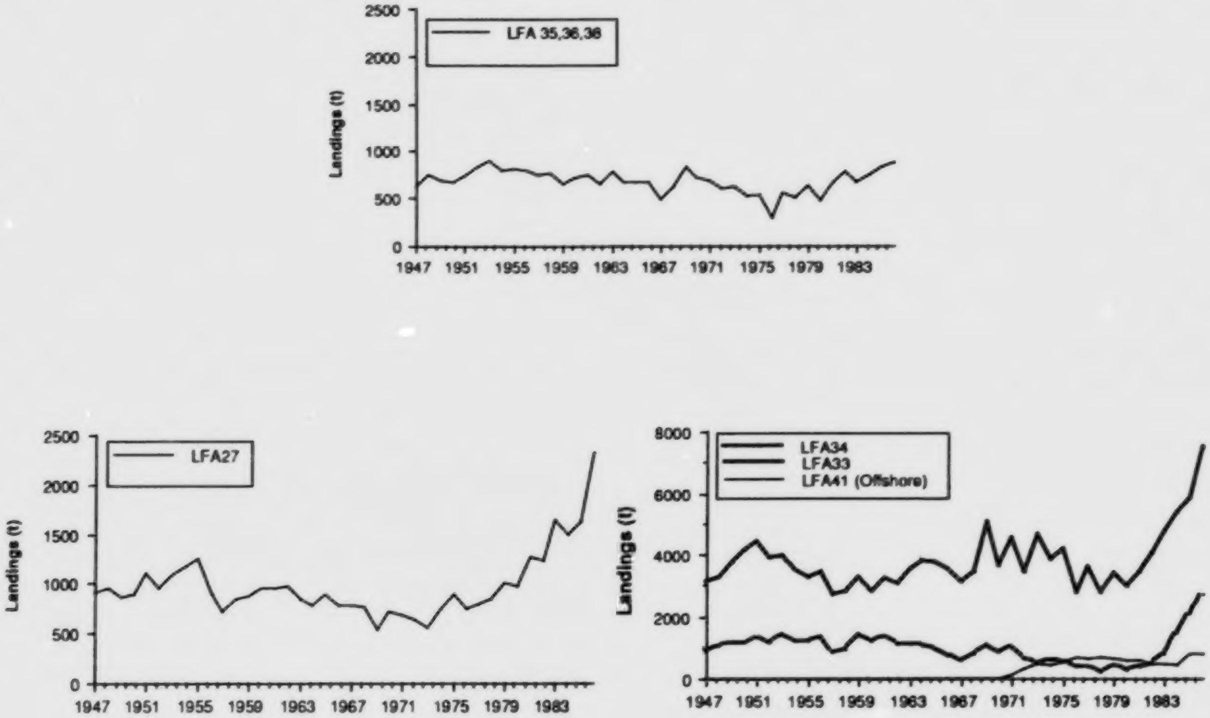
3.3 State of Stocks

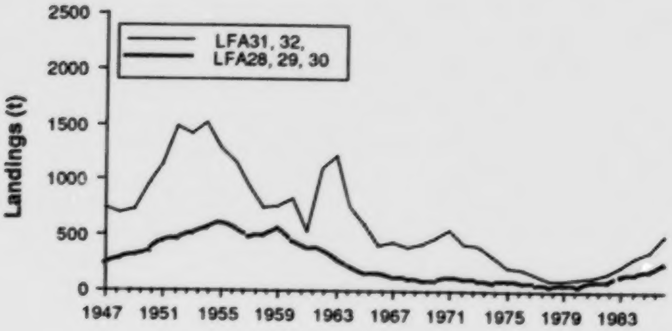
3.3.1 Landing Trends

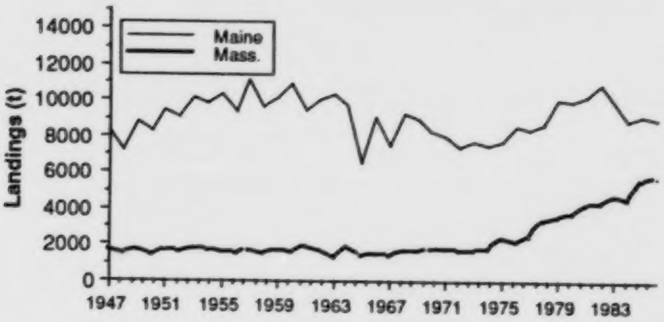
Lobster landings increased dramatically along the Atlantic coast of Nova Scotia during the early to mid-1980's, following a period of near record low landings in the late 1970's. Total landings have more than doubled, and in some areas increased ten fold. Bay of Fundy landings have doubled since 1976, and now exceed 1950's and 1970's levels. LFA 27 landings have reached an all time high, and LFA 33 and 34 have reached their highest levels since the early 1900's. LFA 28-30 landings are 6 times those of the late 1970's, but they are still well below historic levels (Exhibit 3.5).

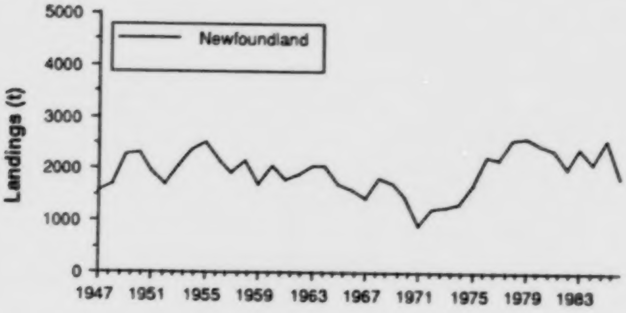
Exhibit 3.5

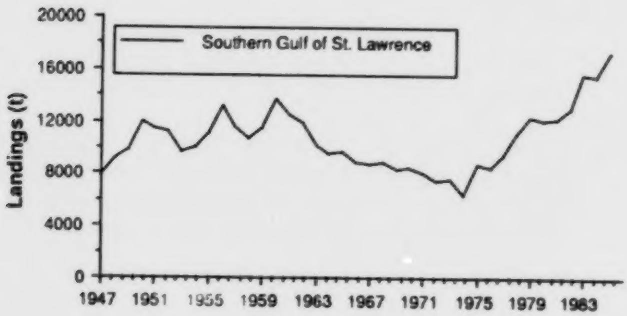
Lobster Landings 1947-1986




2500
2000
1500
1000
500
0
Landings (t)
LFA31, 32,
LFA28, 29, 30
1947
1951
1955
1959
1963
1967
1971
1975
1979
1983


14000
12000
10000
8000
6000
4000
2000
0
Landings (t)
Maine
Mass.
1947
1951
1955
1959
1963
1967
1971
1975
1979
1983


5000
4000
3000
2000
1000
0
Landings (t)
Newfoundland
1947
1951
1955
1959
1963
1967
1971
1975
1979
1983


20000
16000
12000
8000
4000
0
Landings (t)
Southern Gulf of St. Lawrence
1947
1951
1955
1959
1963
1967
1971
1975
1979
1983

Increased landings have not been restricted to the Scotia-Fundy Region. Beginning in the late 1970's, increased landings occurred in Massachusetts, where landings are now at an all time high. In the southern Gulf of St. Lawrence landings are the highest since the early 1900's. Not all areas have shown the same upward trend; increases in Maine have been within historical limits and, in recent years, declined to near average levels.

The increases in Massachusetts, the southern Gulf of St. Lawrence and LFA 27 began in the late 1970's, and in the remaining areas in the early 1980's. American trawling surveys indicated an increase in the offshore populations beginning in the early 1970's on the Scotian Shelf and in the Gulf of Maine, and in the late 1970's on Georges Bank. Abundance in the latter area subsequently declined in the early 1980's, but the remaining areas showed continued increases to 1985.

Except for areas within the Gulf of Maine, where a portion of the increase resulted from new grounds being fished in deeper water, such as in LFA 34, the increased catches appear to be due to an increase of young lobsters entering the fishery. An indication of this is that the weight of lobsters caught per trap hauled has increased in most areas, while effort has increased.

3.3.2 Possible Causes of the Recent Increase

DFO scientists have been considering the role of the environment in controlling recruitment levels. In coastal waters, temperature, wind, freshwater runoff and tidal actions are potential environmental factors affecting recruitment. In more offshore waters, frontal systems, Gulf Stream eddies, and large scale circulation patterns become important.

While both environmental factors and interactions between different species are likely to produce similar effects on several stocks within a particular area where they live together, only large-scale environmental factors are likely to produce similar effects on stocks from different areas. The recent increase in lobster landings has occurred in different stocks and management regimes, indicating that one or more environmental factor(s) are the primary cause. A number of environmental factors have been discussed over the recent past. Each is reviewed below.

(i) Canso Causeway Presence

The presence of the Canso Causeway, erected in 1955, significantly reduced the flow of waters relatively rich in lobster larvae to the less rich waters of Chedabucto Bay. Immediately after the causeway was built, landings declined downstream in LFA's 31 and 32 (Exhibit 3.5). But if the causeway was the cause, landings should not have declined for 6 to 8 yrs, the time for the larval recruits to attain legal size. Interestingly, landings actually increased in 1963, 8 yrs after completion of the causeway. Immediately after the causeway was completed, landings also declined upstream from the causeway in LFA's 28-30 (Exhibit 3.5), in concert with the downstream decline, suggesting that some Atlantic coast phenomenon caused these recruitment patterns.

(ii) Temperature

Temperature affects lobsters at all of their life stages. It controls growth rate, size of maturity, timing of spawning and egg hatching, duration of egg development, health of larvae at hatching, duration of larval stages, and adult migration patterns. Temperature can also affect lobster production indirectly, through changes in the production of nutrients which feed lobster at their larval and early juvenile stages, and through changes in the numbers of predators or competing species.

Temperature can also affect landings over the short term by influencing activity and catchability, and by increasing the probability of molting, which results in a short term increase of recruitment into legal size groups. These short term effects account for year to year variation in landings, but cannot account for the sustained increases observed in recent years.

Numerous studies relating temperature to landings suggest the importance of water temperatures approximately 6 yrs earlier. Since the time to grow to legal size, in the areas studied, is estimated at 5-7 yrs, it is believed that temperature acts on the larval or early juvenile period.

Landings in the Gulf of Maine have shown significant correlation with surface temperatures but no similar correlation has been found along the eastern coast of Nova Scotia. A major difficulty in relating temperature to recruitment is determining which temperature is important, surface or bottom, and how it is to be expressed: mean annual temperature, mean monthly temperature, mean temperature over a portion of the year, degree days, duration above a set temperature, or temperature during a critical period. Failure to find relationships between temperature and landings may be the result of using the wrong definition of temperature and/or expressing it incorrectly.

Lobsters now being landed were hatched during a period of warm coastal water temperatures, that began in 1976. Offshore bottom water temperatures also increased during the 1970's on Georges Bank and in the basins of the Gulf of Maine. Interestingly, the coastal temperatures were below those of the early 1950's, a period which produced lower recruitment from a larger parent stock. It would appear that though temperature plays a role in recruitment success, the relationship is neither simple, nor is it likely the sole factor.

(iii) Fresh Water Runoff

Fresh water runoff has been correlated with Quebec lobster landings in the northern Gulf of St Lawrence, and though the mechanism is not understood, the correlation appears to be holding up into the early 1980's. Other studies have questioned the importance of river runoff and have suggested that climatic events in the ocean, forced by large scale atmospheric circulation may be the primary mechanism.

(iv) Ecosystem changes

Changes in species composition or productivity of the ecosystem can result in changes in abundance of species within it. The destruction of kelp beds by grazing sea urchins in the late 1970's has been cited as a cause of the lobster decline, though there is evidence against such a relationship. Kelp beds reappeared in the early-mid 1980's and lobster landings also increased, but lobster landings in St. Margarets Bay doubled in 1980-1982, prior to kelp recovery. The lobsters recruited into the fishery in 1981-1984 are based on lobsters that spawned and lived in the mid 1970's, during the peak of the urchin outbreak. Similarly, declines and increases in landings have occurred in areas where no kelp was destroyed in LFA 34, Massachusetts and the southern Gulf of St. Lawrence, and where kelp has not recovered in LFA 30.

A reduction in predators due to heavy exploitation of groundfish has also been suggested as a cause for the increased recruitment. The major groundfish populations have been reduced by overfishing in most regions and a link between their numbers and increased lobster abundance has been suggested by fishermen. Groundfish predation on lobsters has not been found in feeding studies, but many of these studies were conducted in offshore waters where lobster densities are low. Further studies are required to determine the role of groundfish in lobster natural morality.

(v) Management

The recent increase in landings appears not to be directly attributable to management changes during the late 1970's and early 1980's, though they are no doubt important in sustaining both the recovery and higher landings. The widespread nature of the recruitment phenomenon, including its presence in Massachusetts, where none of our new regulatory measures were in place, support this idea. Larger vessels, better navigation equipment, difficulties in trap limit enforcement and the inducement of higher earnings have resulted in a net increase in effort in all areas. But the trap limits and buy-back of inactive licences in the Region have put some constraints on the expansion of effort as the catches have improved. These measures along with stronger enforcement of season, minimum size and berried female regulations may help to sustain the high landings.

3.3.3 Outlook

The increase in lobster landings is most likely induced by a widespread phenomenon related to environmental changes; the exact mechanisms, however, are unknown. In all likelihood, there will be a number of mechanisms which will no doubt be interrelated. Although realizing the problem is complex, it will form the basis of a research project.

Scotia-Fundy, Massachusetts and southern Gulf of St. Lawrence landings continued to rise during 1987. Massachusetts and the southern Gulf of St. Lawrence, have shown an upward trend since the mid 1970's with no indication of leveling off. A downturn or leveling off will occur at some time, but the unprecedented nature of the recent increases suggests we cannot use the patterns of historical landings as a guide to future events (Exhibit 3.6). If the recent rise is due to environmental anomalies in the 1970's, then, if environmental conditions return to previous conditions, recruitment would likely decline and landings would drop to a lower level.

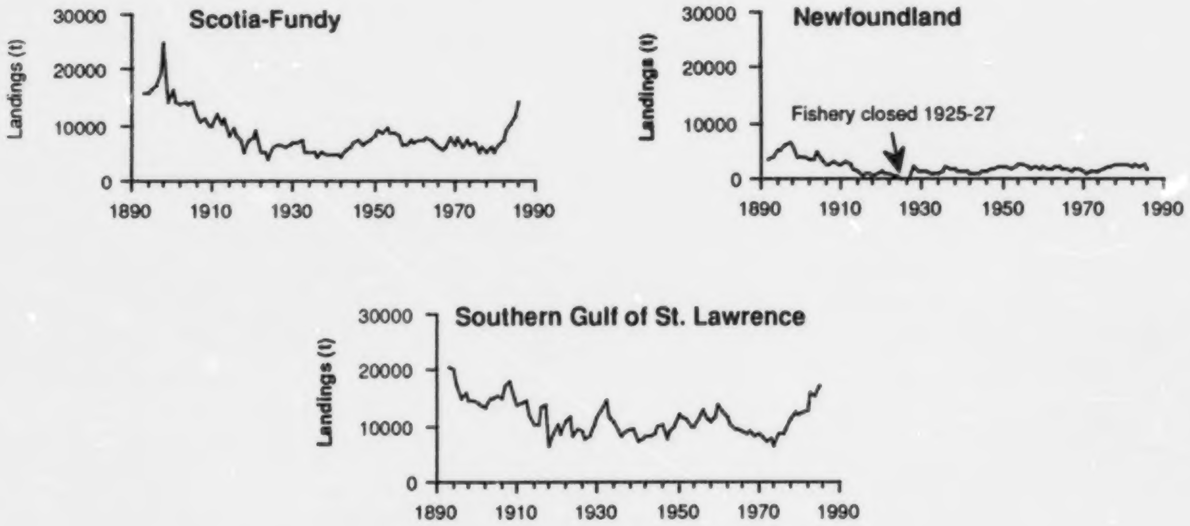


Exhibit 3.6

3.4 Fisheries Enhancement Techniques

3.4.1 Legal minimum size

Although we do not know precisely why nature is providing so many lobsters, we do know with some certainty how to obtain greater landed weight and value from the stocks. A large increase in minimum legal size is the best way to increase yields. This advice has been formally presented 12 or more times in recent years, including recommendations of an international workshop on European and North American lobster stocks attended by most lobster biologists from both continents.

The United States is implementing a small (3 mm) increase in minimum size, from 3 3/16" to 3 5/16" carapace length. A 3 to 7% gain could be expected from the same increase in Scotia-Fundy depending on the LFA.

An increase in minimum size by one year's growth (about 12 mm carapace length) would produce approximately the gains indicated in exhibit 3.7.

PERCENTAGE INCREASE IN YIELD, FOR EACH LFA, FROM A 12 mm INCREASE IN THE PRESENT MINIMUM SIZE

Lobster Fishing Area	Percentage Increase In Yield
35,36,38	33
34	35
33	34
31,32	21
28,29,30	17
27	15

Exhibit 3.7

These predicted gains assume a constant number of lobsters entering the fishery. Gains occur because at the present legal size the weight added by 1 year's growth exceeds the weight lost to natural deaths (e.g. disease, predation, storms). The gains are less for areas 28-32 than for 33-38 because the fishing intensity is lower and a greater portion of lobsters already live to reach the larger sizes before capture. If fishing intensity is increased, then gains from a larger minimum size are also increased. Area 27 is a special case because it is a canner fishery with a legal minimum size of 70 mm. Canner lobsters are less vulnerable to trapping than market-size lobsters, allowing many to reach market size even under high fishing pressure. Therefore, the average weight gain from an added year's growth, (which would nearly eliminate the canner sizes) is a modest 15%, but because the market sizes bring a higher price per pound, the gain in value would be much higher.

Increasing the minimum legal size by 1 year's growth would increase egg production by 2-8 times in different fishing areas. This would occur because more lobsters would live long enough to spawn for the first time and, the average spawner would produce more eggs because it would be larger.

3.4.2 Ghost Fishing by Lost Traps

Lost traps capture lobsters by attracting them to the original bait. They continue to capture lobsters at a reduced rate even after the bait is eaten. In two studies done in 1978 divers kept weekly records of the number of lobsters that entered traps, the number that were found dead in traps, and the number that were missing (eaten or escaped), with the following results.

No. Traps	Dates	Location	No. Entered	Known Dead	Missing
40	June-Aug.	Maine	144	32 (22%)	47 (33%)
40	June-Sept.	Mass.	249	72 (29%)	81 (33%)

During 3 1/2 months of observations 0.8-2.0 and 1.8-3.8 lobsters per trap died in the Maine and Massachusetts studies, respectively. Loss to ghost fishing in the U.S. fishery has been estimated at 5% of landings. Because Scotia-Fundy has fewer traps and shorter seasons this percentage would be somewhat less. A loss of even 1% of landings due to ghost fishing represented a waste of $1.4 million in revenue to Scotia-Fundy fishermen in 1987. A panel insert, which would fall out of a trap after several months in the water and expose a large hole in the parlour section is the recommended solution for ghost fishing. This remedy should be directed particularly at long lasting wire or plastic traps. Regulations requiring the use of ghost panels in wire traps are being put into effect.

3.4.3 Release of Undersized Lobsters

If traps are constructed so that undersized lobsters (shorts) can escape, then fewer shorts will need to be removed when traps are hauled. Thus traps can be fished more quickly. As well, fewer shorts will be exposed to predators when they are returned, in daylight, to the bottom away from shelters. Fewer shorts will die in lost traps, and poachers who retain illegal sized lobsters among their legal lobsters will catch fewer shorts to sell. Regulations requiring use of vents or minimum lath spacing are being put into effect.

3.4.4 Trap Reduction

Yields can be increased by reducing fishing effort – that is the number of traps hauled or days fished. This would allow more lobsters to escape the annual fishery and grow to a larger size. However, a very large effort reduction, estimated at about two-thirds the present levels, would be required to achieve the same gains as that possible through a 12 mm increase in minimum carapace size.

4 The Harvesting Sector: A 10-Year Perspective

4.1 Historical Overview

The lobster fishery in Scotia-Fundy consists of an inshore and offshore sector. The inshore fishery is conducted along the Atlantic coast and in the Bay of Fundy. Inshore fishermen operate up to 60 nautical miles offshore, though in most areas the lobster grounds extend only a few miles from the coast. The offshore fishery occurs beyond 50 miles in LFA 41, and is concentrated on Georges and Browns Banks. (See preface map of lobster fishing areas, page X.)

Over its almost 100 years of recorded history, the inshore fishery has experienced cyclical and seasonal fluctuations in landings caused by poor recruitment, variations in catch rates, and strong competition among fishermen. These factors have resulted in considerable instability in earnings. To combat this problem, DFO has, in recent years, introduced several regulatory measures to control fishing capacity. Limited entry licensing and trap limits were introduced in the late 1960s. During the period of particularly weak landings and markets in the 1970s, a government funded buy-back program was introduced. The program led to the retirement of some 1,300 licences in the Scotia-Fundy Region between 1978 and 1981.

The Canadian offshore lobster fishery started in 1971. Six vessels participated initially and by 1975 the number of licencees had increased to eight. The fleet has been held at this level since the decision to limit entry to eight vessels was made, largely in response to concerns raised by inshore fishermen in southwestern Nova Scotia, LFA's 33 and 34,about the possible effects offshore harvests might have on inshore stocks. Since 1985 the offshore fishery has been managed through a system of total allowable catches (TAC) and enterprise allocations.

4.2 Sources of Data

The analysis in this section is based on (1) DFO statistics, (2) other publications specifically referenced in exhibits, and (3) a survey of lobster fishermen conducted during July and August, 1988. This survey supplemented DFO data by obtaining information directly from fishermen about how the fishery has changed since 1978. Questions were asked about such matters as vessel and gear characteristics, fishing operations, employment, and income. Fishermen were also able to voice opinions on the management of the lobster fishery.

The survey questionnaire was sent to all 3,100 licensed lobster fishermen in the Region. Just under 1,100 fishermen responded, a response rate of 35%. The response rate was 40-45% in LFA's 28, 29, 30, 31, 32, and 33; 30-35% in LFA's 34, 35, and 38; 23% in LFA 36; and, 27% in LFA 27. To assess whether the survey results were representative, average vessel characteristics and landings calculated from survey responses were compared with corresponding DFO statistics on all fishermen for 1987. Average landings from the survey were within 20% of the DFO data in LFA's 27, 32, 33, 34, and 35. This confirms the reliability of the survey. The survey average was based on responses from fishermen who had been active for at least 10 years, and this might account for the 20% difference. There may be some uncertainty in the results from the areas with fewer fishermen (LFA's 28, 29, 30, 31, 36, and 38), where average landings according to the survey differed from DFO statistics by more than 20%.

4.3 Licencee Profile

4.3.1 Inshore Sector

Since 1982, the number of lobster licences of all types has stabilized at just over 3,100 compared with 4,440 in 1978. Licences consist of three categories. These include:

> **"A" licences** (2,769 currently held) are issued to persons dependent on the fishery for their livelihood, and who are not fully employed outside the fishery. "A" licences are transferable.
>
> **"B" licences** (229 currently held) are issued to persons who were engaged in the fishery in 1968 and in each subsequent year, and who did not fulfill the employment criteria of an "A" licence. "B" licences are not transferable and revert to the crown upon retirement from the fishery or upon the death of the licencee.
>
> **Partnerships** (65 exist) may be created when two "A" licence holders combine operations and fish from the same boat. A partnership is restricted to the legal number of traps for a single "A" licence plus 50%.

Exhibit 4.1 shows there is wide variation in the number of "A" licences by LFA from 90 issued in the upper Bay of Fundy, LFA 35, to 951 in LFA 34 from Digby to Shelburne County. A licence may be fished from any port in the LFA for which it is valid. Only in LFA 33, southwestern Nova Scotia, is there a significant number of "B" licences and, only in LFA 38, around Grand Manan, is the number of partnerships significant. Exhibit 4.1 also shows that most lobster fishermen hold licences in other fisheries. The other licences most commonly held are groundfish, herring, mackerel, swordfish, and scallop. The proportion of fishermen holding other licences ranges from about 60% in LFA 27, northeastern Cape Breton, to over 85% in LFA 38. Many fishermen who do not hold lobster licences are active as crew members on lobster vessels and so are a part of the lobster fishery, just as many lobster licence holders crew on groundfish vessels.

Holding multiple licences has traditionally been the key to survival in the small-boat fisheries in Atlantic Canada. The lobster season in many areas lasts only two months and the fishing season ordinarily lasts six to eight months. Participation in several fisheries has often been necessary to earn a reasonable income, and in bad years, even this has not been possible.

SCOTIA-FUNDY LOBSTER FISHERY PROFILE

LFA	Geographic Location	Season	Trap Limits			Licences 1987				Licences 1978	1987 Percent of Fishermen with Other Licences	% of Fishermen Dependent on Lobster for 80 % of Total Landed Value	
			A	B	Partnership	A	B	Partnership	Total (1)			1978	1987
27	High Capes to Indian Point	May 15 to July 15	275	83	413	447	41	6	500	608	60.4	62.0	81.0
28 (2)	Bras d'Or Lakes	May 9 to July 9	275	83	413	16	2		18	216 (3)	70.9 (3)	76 (3)	87(3)
29	Point Michaud to Ragged Head	April 30 to June 30	275	83	413	59	20		79				
30	Indian Point to Point Michaud	May 19 to July 20	250	75	375	17	1	1	20				
31	Ragged Head to Ecum Secum	April 19 to June 20	250	75	375	136	11	2	151	310	79.9	31.0	56.0
32	Ecum Secum to Cole Harbour	April 19 to June 20	250	75	375	148	16	2	168	322	83.2	22.0	47.0
33	Cole Harbour to Baccaro Point	Last Mon. in Nov. to May 31	250	75	375	650	117	4	775	1,137	76.0	12.0	44.0
34	Baccaro Point to Burns Point	Last Mon. in Nov. to May 31 (4)	375/400	113/120	563/600	951	7	12	982	1,335	64.0	49.0	68.0
35	Burns Point to Alma	Oct. 14 to Dec 31 Last day of February to July 31	300	90	450	90	3	1	95	138	68.8	75.0	92.0
36	Alma to US Border	2nd Tues. of Nov. to Jan 14 March 31 to June 29	375	113	563	166	10	10	196	230	69.0	22.0	50.0
38	Grand Manan Island	2nd Tues. of Nov. to 4th Thurs. of June	300	90	450	81	1	27	136	143	86.0	20.0	17.0
41	Offshore TAC	Oct. 16 to Oct. 15	1,000 trap limit			8			8	8			
Total			928,300 tags issued annually			2,769	229	65	3,128	4,447			

Note: 1) Partnership licences are counted as two licences in the total since they can revert to two lobster licences if the partnership is dissolved.
2) In the remainder of the chapter LFA 28, 29 and 30 are combined for discussion purposes.
3) LFA 28, 29 and 30 are combined.
4) LFA 34 fishermen receive two issues of trap tags , 375 in the fall and 400 in the spring.

Exhibit 4.1

In most areas, the relative importance of the lobster fishery as a source of income has increased over the past ten years (Exhibit 4.1). In areas such as LFA's 27-30 and 35, the percentage of licence holders heavily dependent on lobster increased from 60 to 70% in 1978 to 80 to 90% in 1987. In LFA's 31-33 and 36, the New Brunswick side of the Bay of Fundy, the percent heavily dependent on lobster was 10 to 30% in 1978, and is now 45 to 55%. The increase in LFA 34 is from about 50 to 70%. Only in LFA 38 has there been no change.

There are two main reasons for the differences among LFA's in the relative importance of lobster: differences in the size and productivity of lobster grounds, and differences in the abundance and value of other species. The general trend towards increased dependence is explained by greatly increased landings of lobster over the past 10 years, and the decline in landings of other species due to greatly increased competition with specialized inshore vessels, particularly in the case of groundfish.

With limited entry licensing in the inshore lobster fishery no new licences have been issued since 1968. "A" licences can be transferred from one fishermen to another provided the new participant fulfills the employment criteria of an "A" licence. More than 650 licences were transferred between 1983 and 1987 throughout the Scotia-Fundy Region, 23% of the total number of "A" licences (Exhibit 4.2). On an annual basis, the number of licences that changed hands between 1983 and 1985 was between 3.0 and 3.5%; in 1986 and 1987 this increased to almost 7%.

The average age of Category "A" licence holders in the Region in 1987 ranged from 43.0 years to 49.5 years, depending on LFA (Exhibit 4.3). Category "B" licence holders are generally at least 5-10 years older than "A" licence holders. The exception to this is in LFA 33 where "B" licence fishermen are on average 1.5 years younger. The two dominant age groups are 30-44 years and 45-59 years, comprising 38 and 36% respectively of all fishermen (Exhibit 4.3).

CATEGORY "A" LICENCE TRANSFERS 1983-1987

LFA	1983	1984	1985	1986	1987	Total	Average per Year
27	12	14	2	39	23	90	18
28 29 30	2	1	3	6	8	20	4
31	1	7	2	9	5	24	5
32	4	0	4	23	6	37	7
33	17	35	33	39	59	183	37
34	46	10	34	48	66	204	41
35	8	4	3	9	6	30	6
36	5	3	6	15	9	38	8
38	4	6	6	2	7	25	5
Total	99	80	93	190	189	651	130
% of Total Licences	3.5	2.9	3.3	6.8	6.8	23.3	4.7

Source: Fisheries and Oceans, Scotia-Fundy Region, Licensing Data

Exhibit 4.2

AGE PROFILE OF LOBSTER LICENCE HOLDERS – 1987

LFA	Category A - % Distribution				Average Age Category A	Average Age Category B
	<29	30-44	45-59	>60		
27	20	36	34	10	43.2	56.6
28 29 30	9	23	48	20	49.5	55.9
31	8	30	43	19	49.3	57.5
32	12	23	44	21	48.8	54.1
33	13	34	34	19	47.1	45.5
34	11	46	36	7	43.9	59.6
35	24	27	39	10	45.0	55.5
36	8	43	35	15	45.9	62.5
38	13	39	38	9	43.9	52.5
Total	13	38	36	13		

Source: Fisheries and Oceans, Scotia-Fundy Region, Licensing Data.

Exhibit 4.3

On average, across all LFAs, 13% of lobster fishermen are more than 60 years old (ranging from 7% in LFA 34 to 21% in LFA 32) and 13% of lobster fishermen are under 30 (from 8% in LFA 31 and 36 to 24% in LFA 35).

4.3.2 Offshore Sector

Of the 8 offshore licences, 7 are held by Clearwater Fine Foods Ltd. Some of the vessels are licensed to fish other species such as groundfish and scallop, but revenues from these other species are small compared with lobster.

4.4 Fleet Characteristics

4.4.1 Inshore Sector

Lobster vessels are generally larger, more powerful, and better equipped now than ten years ago (Exhibit 4.4). The proportion of the fleet with wood hulls has dropped in all areas. Fibreglass is the material of choice for replacement vessels. There is also a trend away from gasoline engines, with most new vessels diesel-powered. An indicator of the increasing technological sophistication of the fleet is that more than 40% of vessels in most LFAs are now equipped with Loran C compared with less than 20% a decade ago. Similarly, most vessels now use hydraulic haulers. There has been a general increase in the use of wire for traps instead of wood, though the increase varies widely by area.

Changes in fleet characteristics have caused vessel capital costs to increase substantially (Exhibit 4.5). Costs have in general doubled in the LFA's in eastern Nova Scotia, and more than doubled in the LFA's in southwest Nova Scotia and southern New Brunswick. Typical lobster vessels in these latter areas tend to cost two to three times more than those in eastern Nova Scotia because they are on average larger, more powerful, and better equipped with electronics and gear.

VESSEL/FLEET CHARACTERISTICS (FOR CATEGORY A LICENCES)

LFA	Average Vessel Length (ft.)		Average Crew Size (including skipper)		% of Vessels:									
					Wood Hulls		Diesel Engines		Loran		Hydraulic Haulers		Wire Traps (1)	
	1978	1987	1978	1987	1978	1987	1978	1987	1978	1987	1978	1987	1978	1987
27	28.1	30.6	1.9	2.4	87.7	66.2	9.5	22.5	9.6	39.7	57.7	90.0	9.2	21.9
28 29 30	24.9	26.8	1.4	2.1	95.0	77.8	10.0	16.7	5.6	13.3	31.6	50.0	0.0	17.4
31	28.2	27.3	1.3	1.6	94.9	87.5	0.0	10.0	2.7	39.5	39.5	72.5	0.0	11.2
32	27.3	27.8	1.3	1.6	92.5	87.2	4.9	17.9	9.8	28.2	32.5	63.2	0.0	31.1
33	31.5	32.6	1.9	2.4	89.8	52.6	18.4	42.2	26.6	54.5	49.2	83.2	35.3	48.0
34	36.1	36.4	2.4	2.9	82.4	23.8	27.2	58.7	49.3	76.7	49.3	83.3	21.1	36.8
35	31.4	33.4	1.3	1.9	91.7	75.0	16.7	33.3	8.3	41.7	33.3	50.0	8.0	21.7
36	37.5	35.2	1.8	2.1	95.5	65.0	18.2	30.0	18.2	45.0	76.2	90.0	25.5	36.7
38	39.6	38.2	2.4	2.8	100.0	78.6	50.0	57.1	53.3	85.7	93.3	85.7	37.6	59.4

Note: The reported use of wire traps may be overstated. The percentage noted likely includes traps that are part wire and part wood.

Source: Survey of Scotia-Fundy Lobster Fishermen, 1988.

Exhibit 4.4

VESSELS (1) AND GEAR CAPITAL COSTS FOR CATEGORY A LOBSTER FISHERMEN

LFA	Vessels Purchased 1976-1980		Vessels Purchased 1985-1987		Trap Cost
	Length (ft.)	Capital Cost of New Vessel (2)	Length (ft.)	Capital Cost of New Vessel (2)	
27	27-31	$8,000-15,000	28-32	$25,000-35,000	$8,000-11,000
28 29 30	26-28	$8,000-12,000	28-30	$15,000-20,000	$7,000-9,000
31	27-30	$8,000-12,000	28-30	$20,000-25,000	$7,000-9,000
32	27-30	$10,000-15,000	28-30	$25,000-30,000	$8,000-10,000
33	28-32	$15,000-20,000	30-34	$50,000-75,000	$9,000-13,000
34	35-38	$35,000-45,000	36-40	$60,000-100,000	$12,000-18,000
35		(3)		(3)	$9,000-11,000
36	35-40	$30,000-35,000	35-40	$60,000-70,000	$10,000-13,000
38	38-42	$35,000-45,000	38-42	$100,000 plus	$12,000-18,000

Note: 1) Vessels purchased by lobster fishermen may also be used in a mixed inshore fishery.

2) The price range shown is representative of typical lobster vessels operating in each LFA. Particular vessels may actually cost more or less than the range noted.

3) Purchase prices vary significantly in LFA 35 making general price ranges difficult to estimate.

Exhibit 4.5

4.4.2 Offshore Sector

The size of the offshore fleet did not change between 1978 and 1987, but within the last few years older steel vessels have replaced wooden ones. The 8 vessels range in length from 60' to 141', with an average length of 107'. All vessels have diesel engines and carry modern electronic equipment. The average vessel age in 1987 was 23 years.

4.5 Quantity and Value of Landings

4.5.1 Inshore Sector

(i) Quantity

There has been a fairly steady growth in lobster landings throughout the Region since the late 1970's, when landings were at, or near, a 40-year low in all areas. Total landings increased from 4,500 t in 1978 to 14,700 t in 1987, an increase of 225%. In most areas landings have shown fairly consistent annual increases, though LFA's 27 and 35-38 have experienced some fluctuation around a generally rising trend. This recent relatively steady growth is a departure from the pattern of landings experienced from the late 1940's to the late 1970's (Exhibit in Chapter 3).

The fishermen in LFA 34 are by far the largest producers, accounting for over half the lobster landed in the Region in both 1978 and 1987 (Exhibit 4.6). LFA 27 and LFA 33 rank a distant second, each accounting for about 18% of landings in 1987. Each of the other areas contributes just over 2% to the total.

TOTAL INSHORE LOBSTER LANDINGS, 1978 AND 1987

	1978		1987	
LFA	tonnes Landed	%	tonnes Landed	%
27	713	16.4	2,680	18.2
28,29,30	39	0.9	299	2.0
31	47	1.1	258	1.8
32	54	1.2	303	2.1
33	238	5.5	2,574	17.5
34	2,736	62.8	7,585	51.5
35	139	3.2	333	2.3
36	198	4.5	344	2.3
38	193	4.4	348	2.4
TOTAL	4,357		14,724	

Source: Fisheries and Oceans, Scotia-Fundy Region.

Exhibit 4.6

(ii) Value

The value of lobster landings increased from $25.4 million in 1978 (at current prices) to $139.0 million in 1987 (Exhibit 4.7). After adjusting for inflation, the 1978 value was $44.5 million, (in 1987 dollars). The distribution of landings by value across LFA's follows closely the distribution by quantity, with LFA 34, southwestern Nova Scotia, accounting for over half the total value.

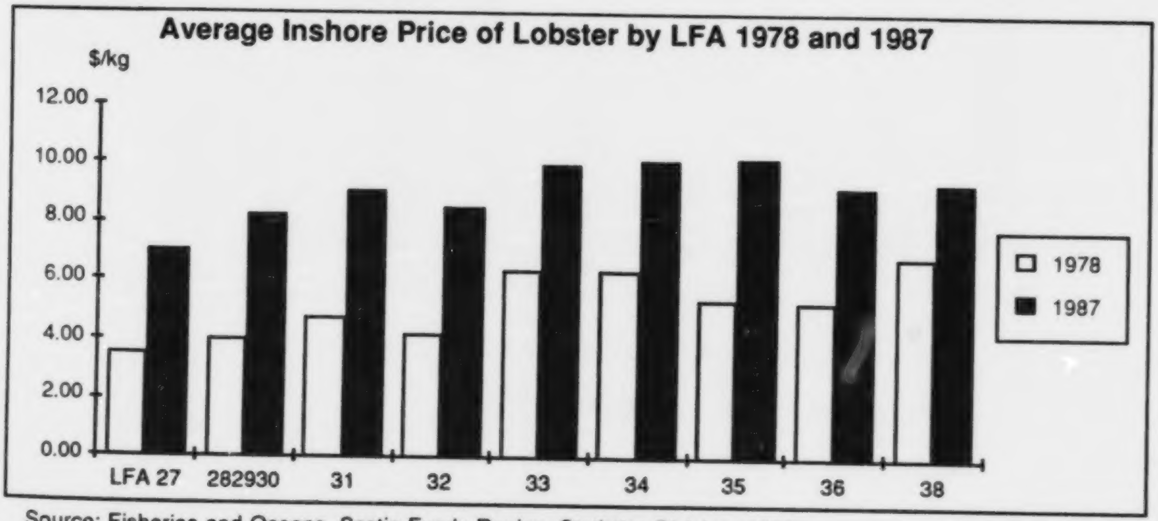
The value of landings has increased at a faster rate than the quantity because prices have also increased. For the Region as a whole, average lobster prices have risen from $5.60/kg to $9.45/kg, an increase of about 70 percent. These are slightly less than prices in the economy generally, which have increased by about 75 percent.

TOTAL VALUE OF INSHORE LOBSTER LANDINGS, 1978 AND 1987

	1978		1987	
LFA	($000)	%	($000)	%
27	2,530	10.0	18,908	13.6
28,29,30	157	0.6	2,474	1.8
31	199	0.8	2,341	1.7
32	253	1.0	2,576	1.9
33	1,546	6.1	25,755	18.5
34	17,537	69.2	77,065	55.5
35	753	3.0	3,403	2.4
36	1,053	4.2	3,167	2.3
38	1,328	5.2	3,267	2.4
TOTAL	25,356		138,956	

Source: Fisheries and Oceans, Scotia-Fundy Region.

Exhibit 4.7



Source: Fisheries and Oceans, Scotia-Fundy Region, Statistics Division, 1988.

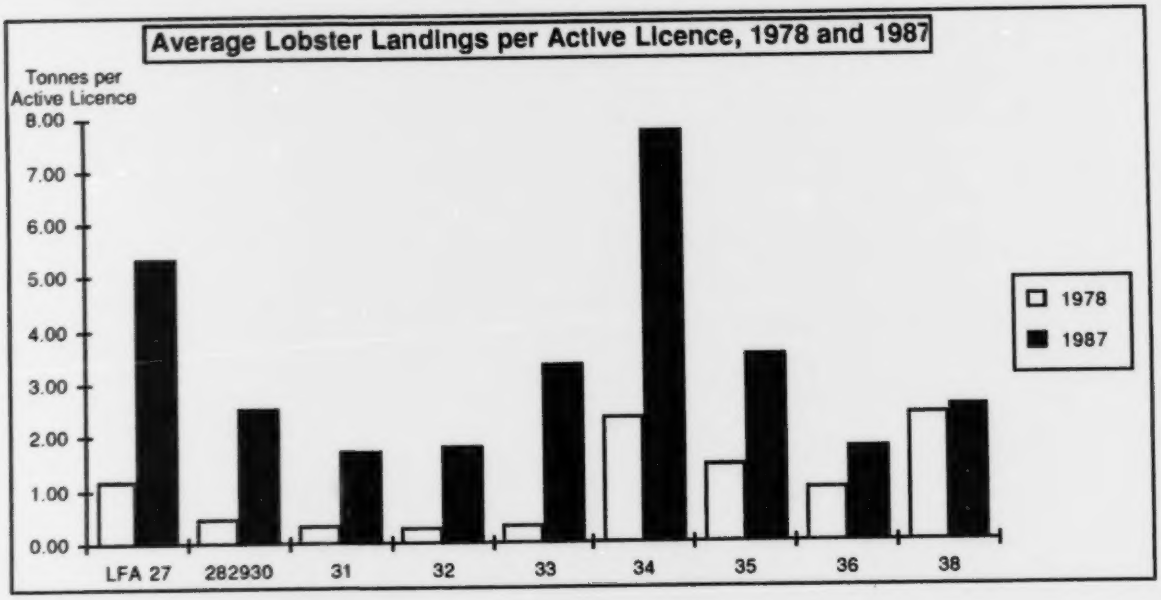
Exhibit 4.8

Average lobster prices vary widely by LFA (Exhibit 4.8). This is due in part to differences in the size mix and in part to the time of year when lobsters are landed. Average prices are lowest in LFA 27 because canners make up a significant part of landings, and also because the lobster season occurs as production in the U.S. and in other areas of the Atlantic provinces is reaching a peak. Prices are highest in southwestern Nova Scotia, LFA's 33-34 where there is no canner fishery and most landings occur in winter and early spring when supplies from other areas are low.

Exhibit 4.8 also shows that differences in average prices among LFA's have narrowed over the past decade. In 1978 the difference between highest and lowest approached 100%; by 1987 the difference was less than 50%. Factors that account for this are greater competition among buyers, improved transportation, and better information on prices paid elsewhere. More discussion on prices appears in Chapter 6.

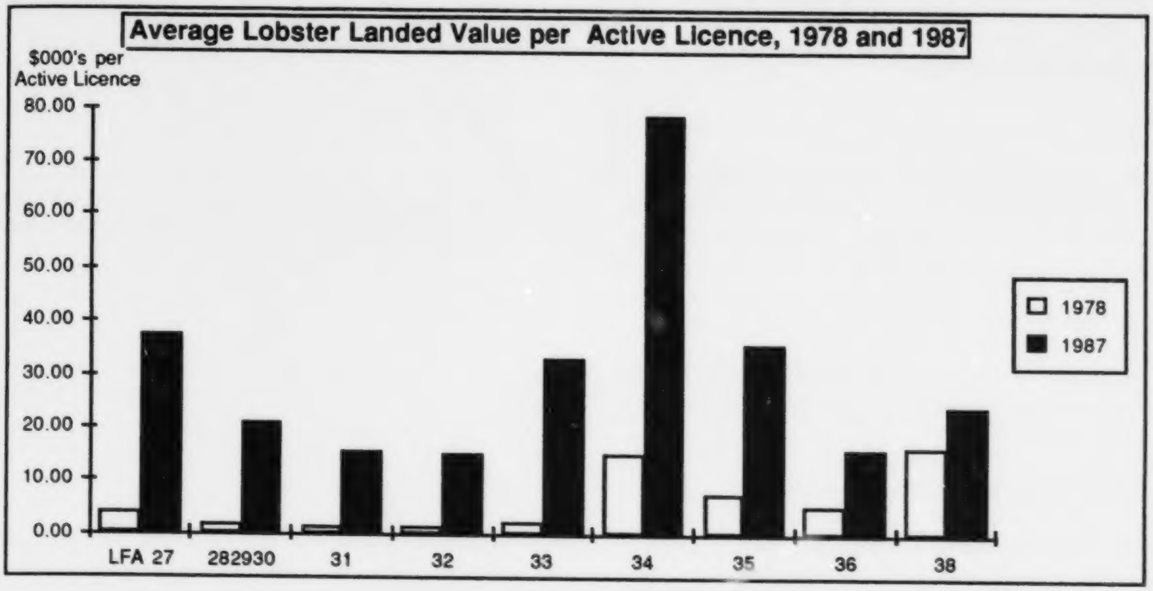
With the general increase in landings and prices between 1978 and 1987, average quantity landed per active licensed lobster fisherman increased from 1.2 to 4.7 t (Exhibit 4.9); average gross value increased from about $7,500 to about $44,500 (Exhibit 4.10). These averages are obtained by dividing the total quantity and value of landings by the number of vessels reporting lobster landings.

Exhibits 4.9 and 4.10 indicate there are wide variations around the average per vessel among the LFAs. By far the richest area is LFA 34, where average quantity landed has increased from 2.4 to 7.7 t, and average gross value from $15,200 to $78,500. Similar gains were made in LFA 27, where the average quantity increased from 1.2 to 5.4 t, and the average value from $4,150 to $37,820. Among the poorest areas are LFA's 31, 32 and 36, where average quantity in 1987 was about 1.8 t, and the average value about $15,500, both well below the regional averages.


Average Lobster Landings per Active Licence, 1978 and 1987

Source: Fisheries and Oceans, Scotia-Fundy Region

Exhibit 4.9



Source: Fisheries and Oceans, Scotia-Fundy Region

Exhibit 4.10

(iii) Distribution of Landings among Fishermen

While some fishermen catch more than others, the differences have decreased slightly over time (Exhibit 4.11). In 1982, the concentration of landings was highest in LFA 35 where just 30% of fishermen accounted for 80% of landings. Only in LFA's 27 and 34 did at least 50% of fishermen account for 80% of landings. By 1987, at least 50% of fishermen accounted for 80% of landings in all but LFA's 33 and 36. Differences in skills, vessels and gear, quality of fishing grounds, and levels of effort, influence the distribution of landings. The trend toward a more even distribution may be explained by an increase in the number of active vessels following the improvements in landings in the early 1980s, and also by increased competition for the resource resulting from the rising prices. There is a concentration of landings among some lobster fishermen. In all LFA's in 1987, more than half the fishermen had below average landings. The proportion below average ranged from 69% in LFA 38 to 56% in LFA's 34 and 35 (Exhibit 4.11)

CONCENTRATION OF LOBSTER LANDINGS AMONG LICENSED LOBSTER FISHERMEN

LFA	% of Fishermen Accounting for 80 Percent of Landings		% of Fishermen in 1987 with:	
	1982	1987	Above Average Landings	Below Average Landings
27	52	56	40	60
28 29 30	34	55	43	57
31	40	53	38	62
32	48	53	42	58
33	41	44	36	64
34	51	60	44	56
35	30	51	44	56
36	48	47	41	59
38	49	53	31	69

Source: Fisheries and Oceans, Scotia-Fundy Region.

Exhibit 4.11

4.5.2 Offshore Sector

(i) Quantity

The eight-vessel offshore fleet landed 663 t of lobster in 1978 and 703 t in 1987 (slightly less than the 720 t TAC). Landings in 1978 were about 13% of total landings in the Scotia-Fundy Region, and about 25% of the inshore landings in LFA 34. In 1987, offshore landings were about 5% of overall landings in the Region, and just 9% of the inshore landings in LFA 34.

(ii) Value

The value of offshore landings was $2.23 million in 1978 and represented about 9% of total regional value. By 1987 the value of landings had more than doubled to $5.14 million and represented about 3.5% of the regional total.

4.5.3 1988 Lobster Fishery Update

Inshore lobster landings amounted to 14,784 t in the Scotia-Fundy Region in 1988, slightly above 1987 landings. Higher spring landings in 1988 were offset by substantially lower landings in the fall. Offshore lobster landings fell to 489 t in 1988.

Due to lower dockside prices in 1988, the total landed value of the Region's inshore lobster fishery decreased to $120.3 million, $18.7 million below the 1987 value. The offshore fishery declined to $3.4 million in 1988 from $4.4 million in 1987.

The average annual Scotia-Fundy lobster price paid at dockside fell by 13% from 1987 to 1988.

4.6 Employment

4.6.1 Inshore Sector

There has been a substantial increase in average crew size in the lobster fishery since 1978. With poor catches and low incomes in most areas in the late 1970s, many fishermen operated without crews. This is evident from Exhibit 4.12 which shows that in 1978, average crew size (including the skipper) was less than two in most areas, with an overall average estimated at 1.9. Improved catches and earnings in the 1980's led many licence holders to take on at least one crew member. Others increased their crew from one to two, and sometimes to three. Some crew members work for the entire season, others work only during the early part of the season when landings are heaviest. In 1987, average crew size by LFA ranged from 1.6 to 2.9, with an overall average of 2.5.

Determining total employment for the lobster fishery is difficult from available information. It is possible to provide reasonable estimates using published data on active vessels and employment information from the survey. These sources indicate that total employment in the lobster fishery declined from 6,350 to 5,330 between 1978 and 1982, and then increased to just under 7,000 in 1987. The approximately 30 percent increase between 1982 and 1987 is explained mainly by the larger average crew size. These estimates include all skippers and crew members who were active for at least part of the season.

The employment estimates were arrived at by multiplying average crew size (derived from the survey) by the number of active vessels. The number of active vessels in 1978 and 1982 was derived using DFO landings data. The same average crew size is used for 1978 and 1982. For 1987, all licence holders and vessels were active; average crew size is based on survey information for 1987.

4.6.2 Offshore Sector

Offshore vessels employ about 50 fishermen (skipper and crew) on a full time basis.

ESTIMATE OF TOTAL EMPLOYMENT- CATEGORY A LICENCES (1)

LFA	1978				1982				1987		
	Average Crew Size (2)	Total A Licences	Estimate of Active Vessels (3)	Total Employment	Average Crew Size (2)	Total A Licences	Estimate of Active Vessels (4)	Total Employment	Average Crew Size (2)	Total A Licences	Total Employment
27	1.9	557	550	1,045	1.9	447	425	819	2.4	447	1,085
28 29 30	1.4	186	69	97	1.4	92	87	124	2.1	92	195
31	1.3	289	144	187	1.3	136	129	172	1.6	136	222
32	1.3	300	162	211	1.3	148	141	187	1.6	148	241
33	1.9	969	775	1,473	1.9	650	618	1,181	2.4	650	1,568
34	2.4	1,325	1,125	2,700	2.4	951	903	2,192	2.9	951	2,782
35	1.3	136	96	125	1.3	90	86	113	1.9	90	173
36	1.8	214	182	326	1.8	166	158	304	2.1	166	369
38	2.4	137	77	185	2.4	81	77	239	2.8	81	281
Total	1.9	4,113	3,180	6,349	2.0	2761	2,623	5,331	2.5	2,761	6,915

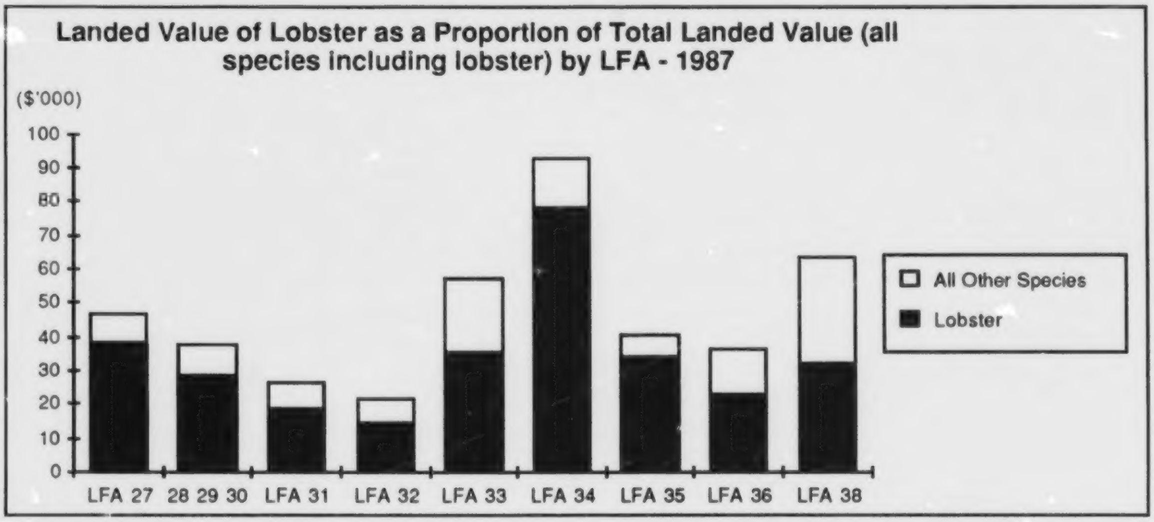
Note: 1) Category B licences are not included in the employment estimate. Partnerships are included in total employment at the rate of two persons per partnership.
2) Average crew size (including skipper) for 1978 and 1987 based on, Survey of Scotia-Fundy Lobster Fishermen. Crew size in 1982 assumed same as 1978.
3) Estimate of the number of boats reporting lobster landings in 1978 was derived by Goss Gilroy and Associates, using Fisheries and Oceans Master Landings File. Gardner Pinfold Consulting Economists adjusted the 1978 data to reflect only Class A licence activity.
4) Pringle and Duggan 1984, estimated five percent of lobster licences in 1982 were inactive.
Source: Fisheries and Oceans, Scotia-Fundy Region

Exhibit 4.12

4.7 Costs and Earnings

4.7.1 Gross Earnings

Lobster licencees derive most of their fishing income from the lobster fishery. The proportion of total fishing income earned from lobster varies from over 80% in LFA's 27, 34, and 35, to 60-75% in other areas (Exhibit 4.13). Only in LFA 38 did other species (mainly scallop) account for a substantial share of gross income (about 50%).

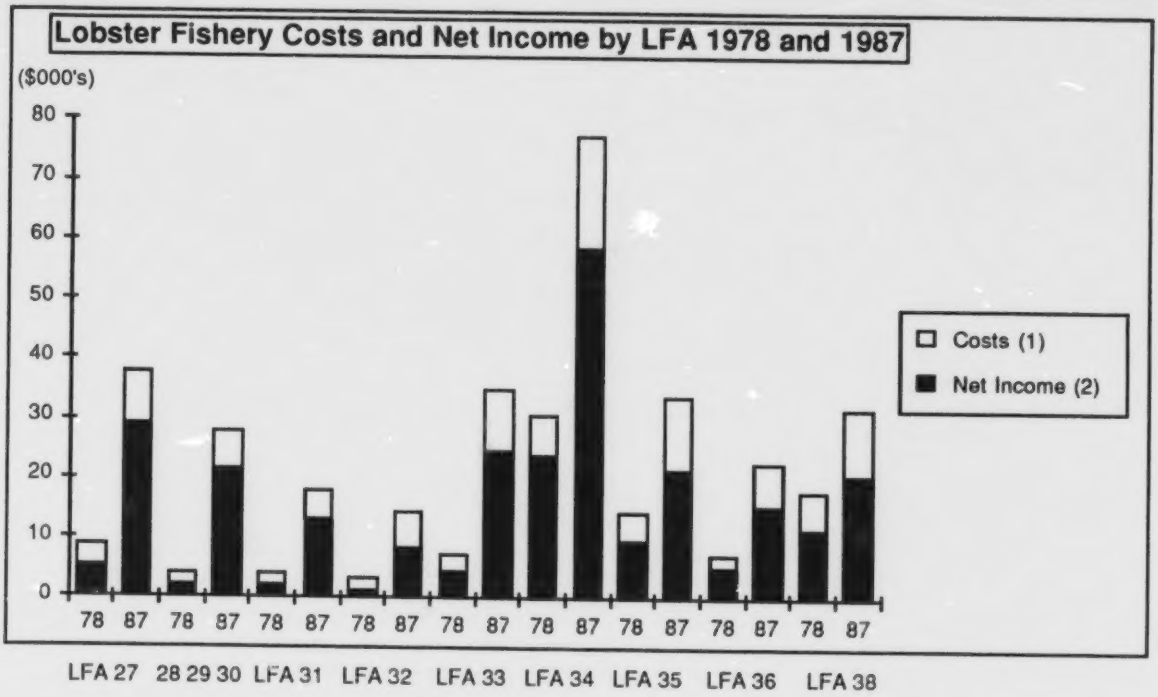

Landed Value of Lobster as a Proportion of Total Landed Value (all species including lobster) by LFA - 1987

Source: Derived from, Fisheries and Oceans, Report on Fishing Vessel Performance, 1985-1987.

Exhibit 4.13

With landings and prices substantially higher in 1987 than 1978, gross earnings by lobster fishermen have increased considerably in all LFA's. Fixed and variable operating costs have also increased, so that less than the full increase in gross earnings has been realized in the form of personal income and returns to the vessel. To show how earnings have changed over the past decade, summary estimates of 1978 and 1987 costs and earnings for typical vessels in each LFA are presented in Exhibits 4.15 and 4.16. These estimates are based on the lobster fishery only; costs and earnings related to other species are not included. In considering these estimates, note that they are based on the performance of typical lobster vessels in each LFA. In general, incomes could be higher or lower for fishermen who operate vessels whose characteristics are significantly different from the typical vessel, and/or whose effort and landings differ from those incorporated in the analysis.

The data in Exhibits 4.15 and 4.16 show a wide variation in costs and earnings among LFA's. These differences are illustrated in Exhibit 4.14, which breaks down gross income into its cost (fixed and operating) and net income (skipper, crew and vessel shares) components. In this analysis the crew share is treated as part of income, and not as a cost, which is traditionally how it is viewed by the skipper.



Notes: 1) Costs include operating and fixed costs shown in Exhibit 4.15 and 4.16.
2) Net Income includes skipper and crew shares and return to vessel.

Source: Fisheries and Oceans, Scotia-Fundy Region.

Exhibit 4.14

4.7.2 Costs

Operating costs have increased as much as three-fold in some areas. The increases are attributable to three factors that vary in importance from one LFA to the next: higher fuel prices; higher bait prices; and higher fuel consumption due to increased effort (more days fished and higher vessel operating hours). In most areas the operating costs have increased less than gross revenues. This is evident from Exhibits 4.15 and 4.16 which show that operating costs as a percentage of gross revenues have declined in LFA's 27-33, and have remained more or less unchanged in LFA's 34-38. Exhibits 4.15 and 4.16 also show that the pattern of change in fixed costs is similar to that of operating costs. Increases have been as high as three-fold in some areas and are attributable to higher insurance payments, higher repair and maintenance costs, and higher debt servicing costs associated with more expensive vessels. While fixed costs have increased considerably in all areas, they have declined as a percentage of gross revenues in LFA's 27-33, and have remained more or less unchanged in LFA's 34-38.

The variable yearly costs of fishing each lobster trap at the current legal trap limit can be estimated. The costs range from a low of $7.50 per year in LFA's 32 and 33, to a high of over $25.50 in LFA's 34 and 35. The average for the Region was approximately $17.00 per trap in 1987.

LOBSTER FISHERY COSTS AND EARNINGS FOR A TYPICAL VESSEL(1) - 1978

LFA	1978								
	Gross (2) Revenue	Operating (3) Costs		Shares (4) Skipper & Crew		Fixed (5) Costs		Return to (6) Vessel	
	$	$	%	$	%	$	%	$	%
27	9,056	1,380	15	2,764	31	2,430	27	2,482	27
28 29 30	4,301	980	23	1,733	40	1,475	34	113	3
31	2,979	840	46	1,783	97	1,500	82	-1,144	
32	2,688	1,065	53	1,178	59	1,125	56	-680	
33	7,659	1,195	16	2,791	36	2,030	27	1,643	21
34	30,831	3,265	11	13,905	45	3,900	13	9,761	32
35	14,567	2,550	18	7,235	50	2,600	18	2,182	15
36	7,480	820	11	3,592	48	1,675	22	1,393	19
38	18,220	1,715	9	8,500	47	4,850	27	3,155	17

Exhibit 4.15

LOBSTER FISHERY COSTS AND EARNINGS FOR A TYPICAL VESSEL(1) - 1987

LFA	1987								
	Gross (2) Revenue	Operating (3) Costs		Shares (4) Skipper & Crew		Fixed (5) Costs		Return to (6) Vessel	
	$	$	%	$	%	$	%	$	%
27	38,000	3,700	10	12,350	33	5,446	14	16,504	43
28 29 30	28,000	2,640	9	13,236	47	3,900	14	8,224	29
31	18,254	2,490	14	13,004	71	2,760	15	0	
32	14,611	3,090	21	8,136	56	3,385	23	0	
33	35,189	4,325	12	13,326	38	6,418	18	11,120	32
34	77,526	8,835	11	34,650	45	10,000	13	24,041	31
35	34,093	6,650	20	16,522	48	6,115	18	4,806	14
36	22,815	2,510	11	10,951	48	4,880	21	4,474	20
38	31,895	2,770	9	15,000	47	8,430	26	5,695	18

Exhibit 4.16

Notes :
1) Owned and operated by lobster fishermen active in the lobster fishery between 1978 and 1987.
2) Revenue from lobster fishery only.
3) Operating costs include fuel, bait, and other.
4) Shares for skipper and crew are derived from Fisheries and Oceans, Report on Fishing Vessel Performance.
5) Fixed costs include insurance, interest, depreciation, repair and maintenance and other.
6) Return to vessel is equal to gross revenue minus operating costs, shares, and fixed costs.

Source: Gardner Pinfold Consulting Economists Limited (derived using Fisheries and Oceans, Report on Fishing Vessel Performance, 1985-1987, database).

4.7.3 Net Income

Combined skipper and crew shares in 1978 ranged from a low of just under $1,200 in LFA 32, to a high of about $14,000 in LFA 34 (Exhibit 4.15). By 1987, the combined shares had reached about $8,100 in LFA 32,a seven-fold increase, and about $35,000 in LFA 34, a two-and-one-half-fold increase (Exhibit 4.16). Income levels in other areas were between these two extremes in both years.

To permit a direct comparison between the 1978 and 1987 net income data, 1978 figures were increased by a factor of 1.75 to account for inflation (Exhibit 4.17). For ease of comparison, this information is depicted in Exhibit 4.18. Some key points which emerge are:

- Skippers have made significant gains in LFA's 27-33, where income has at least doubled in real terms. Fishermen in these areas had relatively low incomes in 1978, and these increases bring them into line with incomes currently earned in other areas (LFA 34 excepted).

- Skippers' incomes have remained fairly stable in real terms in LFA's 34-38.

- There have been substantial increases in crew shares in all areas. Shares have at least tripled in LFA's 27-33, and almost doubled in LFA's 34-38. These increases are due mainly to larger average crew size.

- Returns to vessels (profits) have increased in all areas. The major gains have been in LFA's 27-33. The gains in LFA's 34-36 have been relatively modest.

The $139 million gross value inshore fishery generated a total net income (wages and profits) of $101 million in 1987. This represents an average of $14,400 per participant spread over the 7,000 captains and crew involved.

A few assumptions provide a basis for estimating the results from the fishery if the buy-back had not occurred. If the 1,300 withdrawn licences were active in 1987, as most would have been in this high landing period, they would have produced the same $139 million gross value but the total net income would have reduced to $89 million due to higher costs. The number of fishermen would have been greater, at least 8,300 in total. This would have reduced the average return for skippers and crew to a maximum of $10,500.

NET INCOME SUMMARY FOR A TYPICAL LOBSTER VESSEL

LFA	1978					1987			
	Lobster Fishery Total Net Income[1]		Share of Net Income			Lobster Fishery Total Net Income[3]	Share of Net Income		
			Skipper	Crew	Vessel		Skipper	Crew	Vessel
	($1978)	($1987[2])	($1987)			($1987)	($1987)		
27	5,246	9,181	2,846	1,992	4,344	28,854	5,750	6,600	16,504
28 29 30	1,847	3,232	1,892	1,143	198	21,460	7,515	5,721	8,224
31	639	1,118	2,713	408	-2,002	13,004	10,672	2,332	0
32	498	872	1,887	175	-1,190	8,776	8,136	640	0
33	4,434	7,760	3,777	1,108	2,875	24,446	7,660	5,666	11,120
34	23,666	41,416	12,807	11,527	17,082	58,691	14,800	19,850	24,041
35	9,417	16,480	7,914	4,748	3,819	21,328	7,640	8,882	4,806
36	4,985	8,724	3,490	2,792	2,443	15,425	5,475	5,475	4,474
38	11,655	20,396	10,606	4,283	5,507	20,695	8,000	7,000	5,695

Notes: 1)Total Net Income is equal to skipper share, crew share and return to vessel as shown in Exhibit 4.10.
2)Net Income adjusted for inflation by a factor of 1.75.
3)Total Net Income is equal to skipper share, crew share and return to vessel as shown in Exhibits 4.15 and 4.16.

Exhibit 4.17

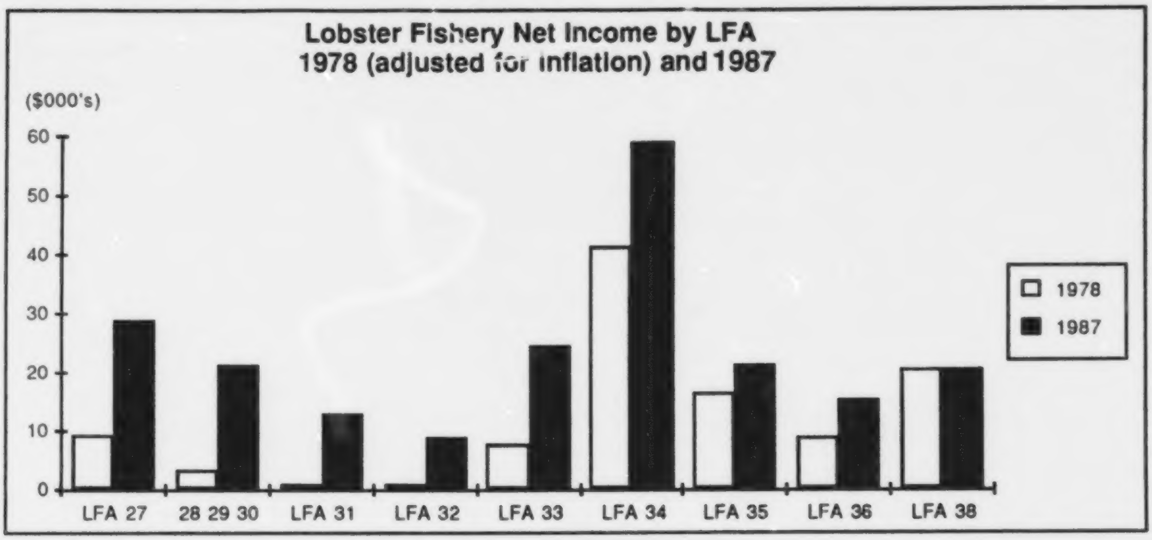

Lobster Fishery Net Income by LFA
1978 (adjusted for inflation) and 1987
($000's)
60
50
40
30
20
10
0
LFA 27
28 29 30
LFA 31
LFA 32
LFA 33
LFA 34
LFA 35
LFA 36
LFA 38
☐ 1978
■ 1987

Exhibit 4.18

5 PROCESSING OR SECONDARY SECTOR

5.1 Introduction

The secondary sector of the lobster industry consists of receiving the lobster at ports, sorting, live storage, some limited processing, and transportation to domestic or export markets. The sector is widely dispersed throughout the Scotia-Fundy Region. Over 180 buyers receive lobster from fishermen at 310 ports. These landings/purchases are channelled for the most part to 92 companies registered with the DFO which provide information on their lobster processing operations. Facilities are located in 78 separate communities in Scotia-Fundy. While the total number of ports at which lobsters are landed has decreased by about 5% since l978, the number of ports receiving more than 50 t of lobster annually has more than doubled during that same period and the number of processing companies has increased by one-third.

Most of the lobsters landed in Scotia-Fundy are of a size to be marketed live or frozen in the shell. Minimal quantities are marketed shucked. The secondary sector in the region has evolved increasingly sophisticated techniques for storage, transportation and marketing of live lobster.

5.2 Lobster Holding / Handling Technology

Seasonal lobster landings in Scotia-Fundy do not coincide totally with peak market demand. The industry, therefore, has developed a holding capacity to supply the market in a systematic, disciplined manner. Holding is done in one of five types of pound: **tidal pounds**, or natural sea enclosures; **crates or cars** moored in the sea close to shore; **inside pounds**, which are buildings containing large cement tanks where lobsters are held in crates in continuously circulated sea water; **tank houses**, or buildings where lobsters are held without crates in smaller tanks through which sea water is circulated; and **dry land pounds**, which are buildings where lobsters are stored in individually separated trays through which sea water is continuously circulated.

The number of licensed pounds increased from 82 in 1978, to 124 in 1987 (Exhibit 5.1). The increase occurred mainly from 1985 to 1987. The number of licensed tidal pounds increased by 5%, the number of inside pounds and tank houses by 15% and the number or crates/cars at moorings by 73%. Two dry land pounds have been built since 1982. Pounds used during the open season need not be licensed. At least 52 unlicensed pounds were operated in 1987.

NUMBER OF LICENSED LOBSTER POUNDS IN SCOTIA-FUNDY 1978-87

County	Number of Pounds by Year									
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Victoria	1	1	1	1	1	1	1	1	2	3
Cape Breton	4	5	7	8	8	6	7	9	15	13
Richmond	2	2	3	3	3	2	3	4	3	4
Guysborough	3	2	3	2	2	1	1	2	2	2
Halifax	10	10	10	9	8	11	10	12	11	11
Lunenburg	4	5	3	2	3	4	4	8	9	9
Queens	1	1	2	-	1	1	1	-	1	-
Shelburne	25	28	19	22	24	27	18	25	37	33
Yarmouth	2	3	3	3	4	6	8	7	8	12
Digby	5	5	3	5	2	3	1	4	8	8
Kings	1	-	-	-	-	1	1	2	-	1
Cumberland	-	-	-	-	-	-	1	1	1	1
Albert	-	-	-	1	1	1	1	1	1	1
Charlotte	21	21	25	25	25	22	21	26	29	24
Saint John	3	5	5	5	7	5	3	3	2	2
	82	88	84	86	89	91	81	105	129	124

Exhibit 5.1

The capacity and distribution of the pounds by type is shown in Exhibit 5.2. Capacity in eastern Nova Scotia more than doubled in 1987 because of the addition of a dry land pound operation. Southern New Brunswick has traditionally served as an assembly area for lobsters from all over the Maritimes to be shipped in the shell to U.S. markets. Tidal pounds and cars in the cold waters of the Bay of Fundy provide 1,400 t of the estimated 1,800 t of capacity for southern New Brunswick at a very low infrastructure cost. These capacity estimates are based on licensing data, plant surveys and field information, and may be high. The flow of monthly landings and the monthly rate of marketing suggest that pound holdings would be under 1,400 t during May to July and over 1,800 t during December and January. Live holdings in pounds during the other 7 months of the year would range from close to zero during April to 1,000 t in October.

ESTIMATED CAPACITY OF LOBSTER POUNDS IN SCOTIA-FUNDY IN 1987
(tonnes)

Pound Type	Capacity	Distribution		
		ENS	SWNS	SNB
Dry Land	1,150	700	450	-
Tidal	1,690	-	550	1,140
Indoor	690	50	320	320
Tank House	530	180	270	802
Car/Crates	1,590	230	1100	260
	5,650	**1,160**	**2,690**	**1,180**

Exhibit 5.2

Within the past 5 years, dry land pounds have been put into commercial operation at 2 locations. Lobsters are graded by size, sex, molting stage and general state of health before being stored in individual trays. Super-cooled water is circulated over the trays to keep the animals in the best condition for much longer periods than other types of pounds. The system operates at very low mortality rates and permits a customized approach to markets. This development in storage was accompanied by an increase in air shipments of live lobster to more distant markets. Air Canada developed a facility to handle live lobster in Halifax, and by 1985 live lobster was one of their top 10 air cargo items by volume and value nation wide. The dry land pound has been instrumental in the growth in export of live lobsters to Europe and Japan described in Chapter 6.

5.3 Processed Value, Employment, and Value Added

Lobster is not subject to extensive processing in Scotia-Fundy. Total regional value at the processor's door is calculated at $147 million for 1986 or 16% above landed value (Exhibit 5.3). This does not include transportation costs from plant to market. Employment in the secondary sector is estimated at 1,500 persons. Most are employed seasonally.

ESTIMATED VALUE ADDED IN THE LOBSTER FISHERY, SCOTIA-FUNDY, 1986

	tonnes	$'000
LANDINGS	14,899	126,822
"PROCESSED" OUTPUT		
Meat Frozen (live equivalent)[1]	39	183
In Shell to Market[2]	11,747	116,075
In Shell to Other Regions[2]	3,113	20,353
		146,661
VALUE ADDED		**19,789**

(1) Derived from end of year inventory and sales during year.

(2) Derived from gross and net sales by firms.

Exhibit 5.3

5.4 Buyer Concentration in the Lobster Fishery

Prices in general reflect conditions of supply and demand, as well as the structural characteristics of the market. Concerns have been expressed about the possible effects of market concentration on prices paid to fishermen. The market structure does not appear to lend itself to price fixing. There are over 180 buyers in the Region operating at 310 ports and there is relatively easy entry into lobster buying. These 180 buyers may sell to the established 92 exporters or may export on their own. Lobster can be held live for relatively long periods and the proximity of U.S. markets provides fishermen the option of exporting directly.

One measure of the change in buying patterns over the past 10 years is provided through the Gardner Pinfold survey of lobster fishermen. Fishermen were asked how many buyers they sold to in 1978 and how many they sold to in 1987. In some LFA's, the percentage of fishermen who sold to a single buyer increased, in others it decreased. Overall, 78% of fishermen sold to one buyer in 1978 and 73% did so in 1987. Buyer loyalty is still relatively high but 5% more fishermen than 10 years ago indicated that they shop around for price through the season now. This change in loyalty is moving in a direction which suggests more bargaining power for fishermen.

The extent of buyer concentration in the inshore lobster fishery can be shown by examining the activities of the largest purchasers (Exhibit 5.3). The top 10 buyers accounted for 34% of purchases, the next 68, the "mid-size" buyers, accounted for 56%, and the 102 smallest buyers accounted only 10% of the landings. These figures suggest that fishermen sell to a variety of buyers.

ACTIVITY OF THE LARGEST BUYERS IN THE SCOTIA-FUNDY - 1987

ITEM	SEASON		TOTAL REGION
	WINTER	SUMMER	
Lobster purchases (t)	11,033	306	14,096
Number of buyers	163	33	183
Number of fishermen	2,080	920	3,000
Percentage purchased by			
Top 3 buyers	12	41	16
Top 5 buyers	18	55	23
Top 10 buyers	30	74	34

Exhibit 5.4

The concentration relationship can be compared between ports with high buyer concentration and ports with low buyer concentration. This can be done while keeping other factors which affect price as constant as possible. Weekly purchases at ports in Cape Breton are presented in Exhibit 5.4

PRICE COMPARISIONS 1987 FOR PORTS IN CAPE BRETON WITH HIGH AND LOW BUYER CONCENTRATIONS

WEEK ENDING	LEVEL OF CONCENTRATION	
	HIGH[1]	LOW[2]
	$/kg	$/kg
May 16	7.02	7.07
23	7.06	7.07
30	7.56	7.50
June 6	7.99	7.89
13	7.73	7.75
20	8.14	8.11
27	8.58	8.57

(1) Two ports where the principal buyer at each port buys more than 85% of the lobster landings.

(2) Two ports where the principal buyer at each port buys less than 50% of the landings.

Exhibit 5.5

Fourteen ports involved with the winter lobster fishery in southwest Nova Scotia were evaluated using the same approach. The average seasonal price reported to the Department in 1987, from 6 ports where the principal buyers accounted for 50% or more of the port landings, was $9.99/kg, compared to $10.21/kg at 8 ports where the principal buyers accounted for 20% with 40% of the landings. The southwest ports involved in the comparison were among the highest in reported landings in the Region.

Differences in the number of dominant buyers from one port to another do not appear to influence significantly the level of prices paid to fishermen.

There are some reasons why prices paid to fishermen should not be adversely affected by buyer concentration in Scotia-Fundy. There are a large number of buyers. Fishermen have good information on prices paid at their port and at neighbouring ports. They have options to hold their lobster catch live and fresh for days or even weeks which they do not have with other types of fish. Most buyers are interested in establishing a long term supply for lobster which they cannot afford to risk for a small price saving. These findings are confirmed in Chapter 6 by comparisons of trends between prices paid to fishermen and prices in major U.S. markets.

6 MARKETS

6.1 Supply Perspectives

6.1.1 World Supply

The American lobster (*Homarus americanus*) and the European lobster (*Homarus gamarus*), which is found along the coast of Europe from Norway to Morocco, are the only shellfish which can legally be called "lobster" in many countries, including the U.S. About 2,000 t of European lobster are harvested annually which does not satisfy the demand for live lobster in Europe. This demand can only be supplied by American lobster.

Spiny lobsters (also called rock lobster, crayfish, crawfish, langouste or langosta) are usually smaller than the American or European species. Spiny lobster is the name given to lobsters without claws and encompasses over 30 species. The most important are the Panulirid, or spiny lobsters and Jasid, or rock lobsters. Spiny lobsters are found in both warm and cold waters as far north as Japan and the United Kingdom and as far south as New Zealand and South Africa.

Lobsters are a premium seafood and most American and European lobsters are sold live. Lobster meat is normally produced from the smallest and largest lobsters and is usually canned. Spiny lobsters are usually marketed as frozen raw tails especially in the U.S, however, there is a small seasonal market developing for live and fresh whole-cooked spiny lobsters. Heavy Japanese buying in recent years has led to the development of a large trade in frozen whole-cooked spiny lobsters, primarily from cold-water producing countries.

WORLD LANDINGS OF LOBSTER 1982-86
(Thousands of tonnes)

Species	1982	1983	1984	1985	1986
Spiny & Rock	64.6	69.0	76.8	81.7	81.7
European	1.9	2.1	2.3	2.1	1.8
American	40.7	47.7	48.6	53.7	58.1
TOTAL	107.2	118.8	127.7	137.5	141.6

Source: FAO Annual Yearbook, Vol. 62, 1986 and FAO Globe-fish Highlights, June 1987.

Exhibit 6.1

The supply of these species of lobster increased by 32% between 1982 and 1986 (Exhibit 6.1). Spiny lobsters accounted for 58% of landings in 1986; most of the supply came from the Carribean, South America and Australia. Most stocks of spiny lobsters are heavily exploited. Countries such as Australia and New Zealand manage their stocks to ensure a stable supply, but in developing countries, poaching is a serious problem that threatens the long-term stability of some stocks.

6.1.2 Supply of American Lobster

The main harvest of American lobster comes from the Atlantic provinces and the New England states. Canada's lobster landings have increased steadily since 1978 to approximately 39,000 t in 1987. About 38% came from the Scotia-Fundy Region (Exhibits 6.2 and 6.3). U.S. landings also increased over the last 10 years to 20,000 t in 1987. More than 50% of the U.S. harvest comes from Maine; Massachussetts produces about 35%. Only Canada is a net exporter of American lobster.

LOBSTER LANDINGS IN CANADA AND THE UNITED STATES 1978-1987
(tonnes)

YEAR	CANADA						UNITED STATES
	N.S.	N.B.	P.E.I.	QUE.	NFLD.	TOTAL	TOTAL
1978	6,161	4,157	4,700	1,597	2,564	19,179	15,600
1979	7,366	4,371	5,370	1,878	2,591	21,576	16,900
1980	6,484	4,258	5,344	1,550	2,452	20,088	16,800
1981	7,897	4,309	5,355	1,760	2,376	21,697	17,000
1982	8,804	4,794	5,491	1,694	2,021	22,804	18,600
1983	11,066	5,362	5,732	2,092	2,403	27,655	20,000
1984	12,429	5,977	5,986	1,876	2,445	28,594	19,900
1985	14,236	6,805	6,541	2,137	2,920	32,639	20,900
1986	17,990	8,964	8,252	2,288	2,492	37,966	21,000
1987	18,423	7,455	8,727	2,658	2,180	39,442	20,500

Source: Market Analysis Group, Fisheries and Oceans, Ottawa.

Exhibit 6.2

Lobsters landed in Canada are sold at dockside as canner (1/2 to 1 lb) market (1 - 3 lb) or jumbo grades (over 3 lb). Live lobsters can be shipped to the U.S. market without restriction if they exceed a U.S. minimum size limit. Canada' s market grade (3 3/16" carapace length) met that U.S. minimum until recently. Regulations for most of Scotia-Fundy are currently being amended to match the U.S. carapace size increases which are scheduled to go to 3 5/16" by 1992. Most canners are sold as meat but they are also sold live and cooked-in-shell on domestic markets. Some are shipped live to Europe and Japan. Approximately 70% of market grade lobsters are exported live. Canners and markets are used for "popsicle packs" which are lobsters cooked in the shell, packaged in a brine solution and frozen in a plastic sleeve. More than 90% of Scotia-Fundy' s landings are market grade of which 90% are sold live. The Region supplies over 60% of market lobsters produced in Atlantic Canada (Exhibit 6.3).

CANADIAN LOBSTER LANDINGS BY GRADE AND REGION, 1987
(tonnes)

GRADE	SCOTIA -FUNDY	GULF	QUEBEC	NFLD.	TOTAL
Canners	1,200	14,800	500		16,500
Markets and Jumbos*	14,100	5,500	2,500	2,000	23,000
	15,300	20,300	3,000	2,000	39,500

* Jumbos accounted for less than 2% of Scotia-Fundy landings in 1987.

Source: Fisheries and Oceans, Scotia-Fundy Region.

Exhibit 6.3

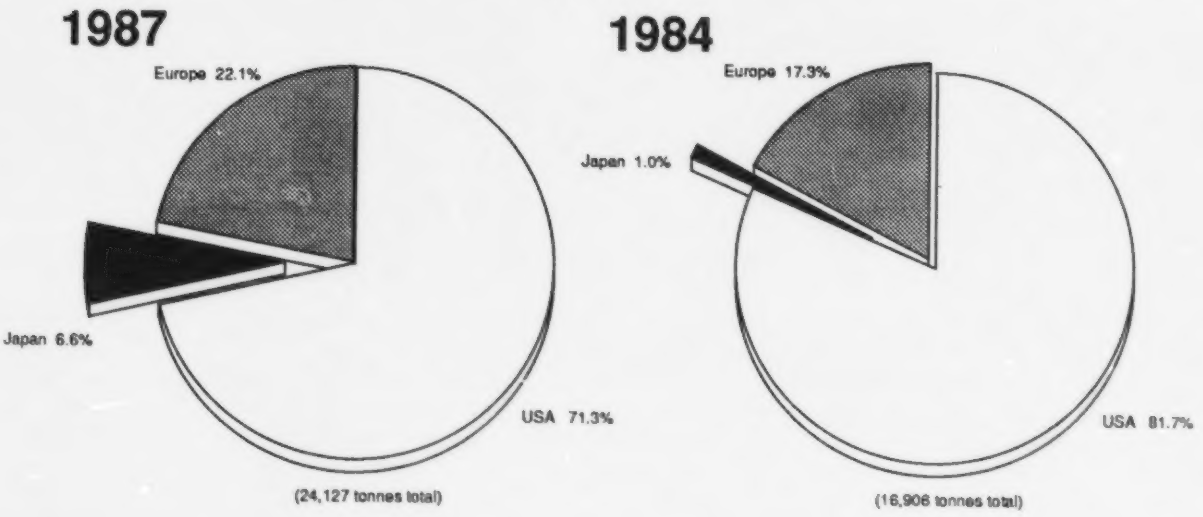
6.2 Primary Markets for Canadian Lobster

6.2.1 Overall Market Perspective

Over 90% of annual Canadian lobster landings are exported. About 67% went in live form in 1987. The other two major forms are the popsicle pack and canned lobster meat. Canned meat is either frozen (cold pack) or canned in the traditional manner (hot pack). Over 95% of the Canadian canned production is now cold pack. Popsicle packs and canned lobster currently make up about one sixth of Canada' s lobster exports, by product weight.

Primary export markets are the United States, Europe (mainly France, the Netherlands, West Germany, Belgium and the United Kingdom) and Japan. Canada' s total lobster exports in 1984 were 16,906 t of which 81% went to the U.S. (Exhibit 6.4). By 1987 exports had increased to 24,127 t of which 71% went to the U.S. Most of the increase went to Europe and Japan. The distribution among product forms exported remained essentially the same between 1984 and 1987. Live exports represented 67% of the total in both years. Popsicle packs and other product forms contributed equally to the remaining 33%.

Total Canadian Lobster Exports
By Market – 1987 *vs* 1984



* Product Weight

Source: Market Analysis Group, Fisheries and Oceans, Ottawa.

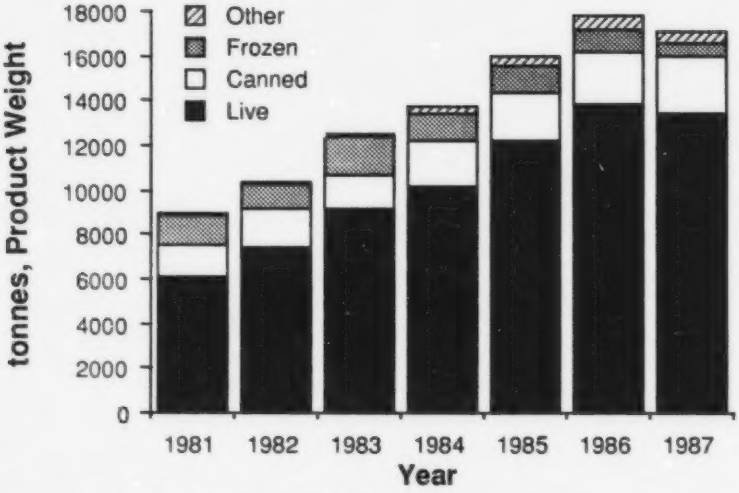
Exhibit 6.4

Canada' s domestic market consumes about 10% of total landings, mostly in the dinner restaurant trade. Canada also imports lobster. In 1987, a total of 2,769 t of lobster with a value of $57 million was imported, mainly from the U.S. but 26% from Cuba. Some of this was lobster exported live to central Canada; processed lobster including spiny lobster was also included.

6.2.2 U.S. Market

The U.S. is the world's largest consumer of lobsters. It accounted for 120,000 t of the 141,600 t of the world supply in 1986. Imports were divided among American live lobster and spiny lobster products. The major suppliers of spiny lobster to the U.S. are Australia, Brazil, and New Zealand.

Over 75% of Canadian lobsters exported to the U.S. are live, while 15% are canned (Exhibit 6.5). The remainder consists of small amounts of popsicle pack, fresh meat and other products. Canadian exports of live lobster to the U.S. have shown sustained growth over the years. Although the principal distribution centre is Boston, more Canadian exporters are shipping directly to customers in the cities of more distant states. The largest U.S. markets are on the east and west coasts.



Canadian Lobster Exports to the U.S.
By Product Form 1981-1987

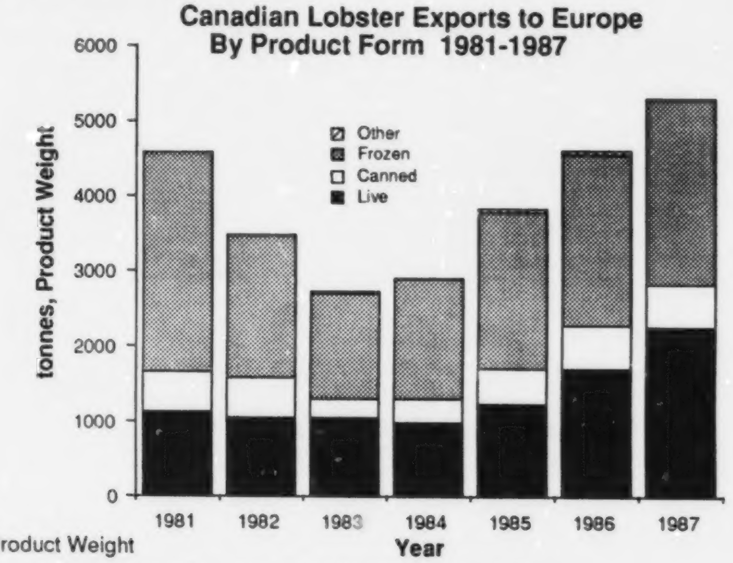
Source: Market Analysis Group, Fisheries and Oceans, Ottawa

Exhibit 6.5

U.S. demand in 1988 is steady following annual increases up to 1987. Domestic production has stabilized and imports increased only marginally in the past year. However, the U.S. industry has recently focused on foreign markets and more lobsters are being sold to Japan and Europe.

6.2.3 European Market

Europe is Canada' s second largest lobster market, accounting for 22% of exports. Exports are split almost evenly between live lobster and popsicle packs. A small amount of frozen canned lobster is also exported (Exhibit 6.6). Live lobster exports to Europe are a growth product, increasing 130% from 1984 to 1987. The major markets are: France (particularly for the Christmas season), the Netherlands, Belgium, West Germany and the United Kingdom. The Netherlands re-exported over 50% of their imports to Belgium, making Belgium the largest net consumer of Canadian live lobster in Europe.



* Product Weight

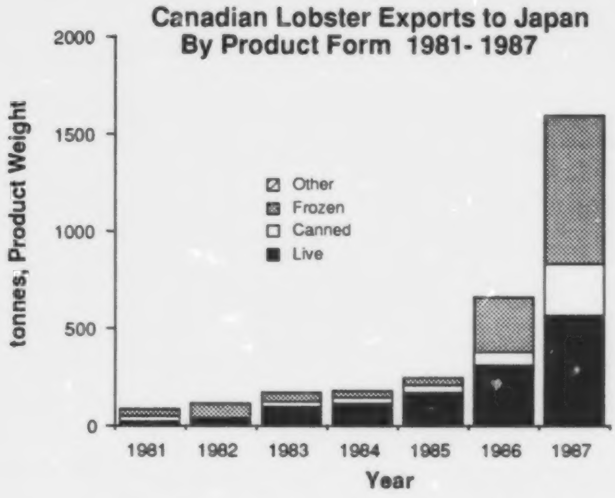
Source: Market Analysis Group, Fisheris and Oceans, Ottawa.

Exhibit 6.6

A weak U.S. dollar and a decline in the U.S. "white-tablecloth" trade have made overseas markets increasingly attractive to U.S. exporters. The pre-Christmas Air Canada strike of 1987 interrupted Canadian supplies and increased competition from U.S. suppliers in Europe. Processed lobster also faces strong competition from spiny lobster and other substitute products, particularly in the restaurant trade. Nonetheless, with effective product promotion, the outlook for exports, particularly of live lobster, is good as long as exchange rates and overall consumer affluence remain stable.

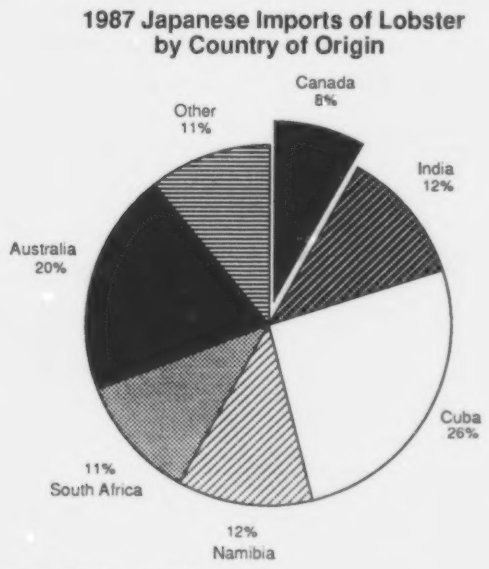
6.2.4 Japanese Market

Japan accounted for 7% of Canadian exports in 1987. It is the fastest growing market for all product forms, particularly the popsicle-pack (Exhibit 6.7). Total Canadian exports to Japan increased by 140% from 1986 to 1987. Both Canada and the U.S. supply Japan, but Canada' s market share is 81%. Of the 10,640 t of lobster and lobster product imported by Japan in 1987, approximately 1,500 t was Canadian (Exhibit 6.8). Japan' s other major suppliers were Cuba and Australia. Spiny lobster dominated Japanese imports.



Source: Market Analysis Group, Fisheries and Oceans, Ottawa.

Exhibit 6.7



Product Weight Total: 10,373 tonnes
Source: Market Analysis Group, Fisheries and Oceans, Ottawa.

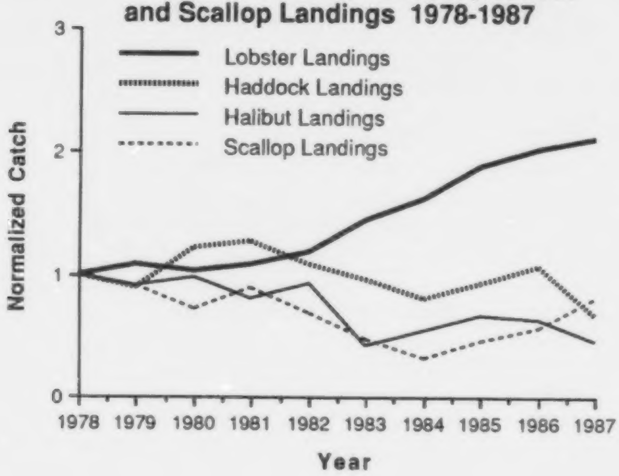
Exhibit 6.8

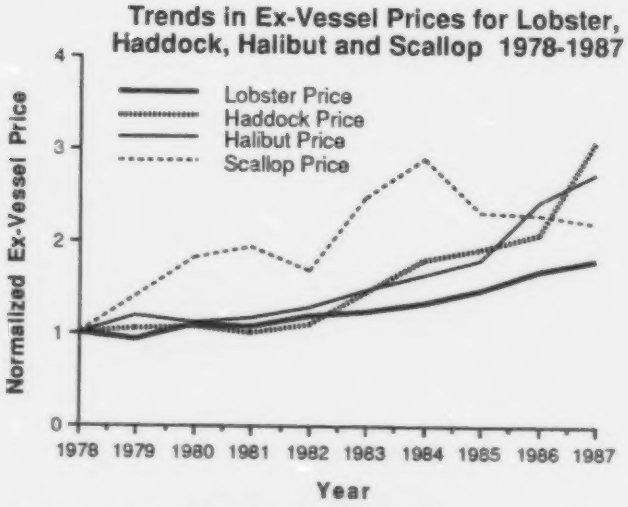
Canadian lobster is a highly regarded seafood in Japan and is used to draw customers to restaurants and hotels. The rapid growth in popularity is expected to continue and imports of Canadian lobster are expected to increase accordingly. Canadian lobster exports to Japan for 1988 are expected to reach $30 million; this is all new business generated during the last 4 years.

6.3 Price Trends

6.3.1 Price - Supply Relationships

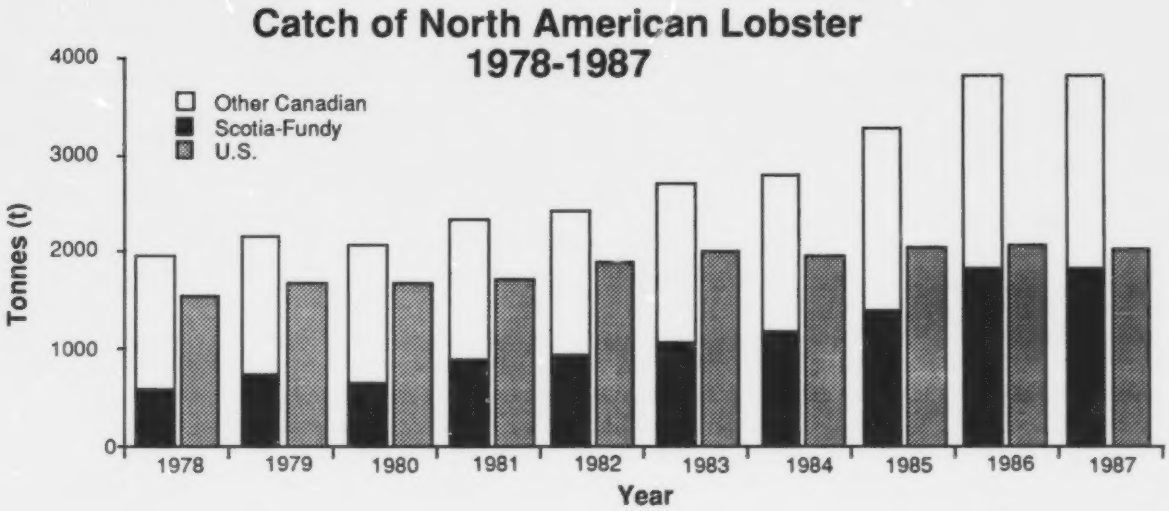
Exhibit 6.9 presents the trends in landings and prices of 3 important seafood products - haddock, halibut, and scallops - in relation to lobster, relative to a base year of 1978. For these species, increases in the Scotia-Fundy ex-vessel price, the prices paid to fishermen, have been associated with significant reductions in quantities landed. Canadian lobster is an exception. Price increases for lobster, while more modest, have taken place while landings have doubled in Canada and while they have also increased in the U.S. (Exhibit 6.10).





Source: Fisheries and Oceans, Scotia-Fundy Region

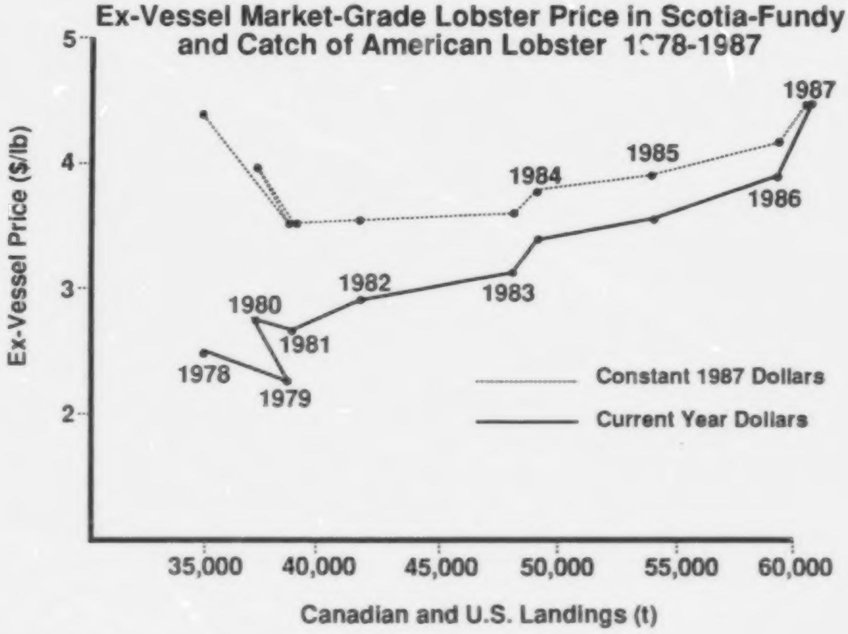
Exhibit 6.9



Source: Fisheries and Oceans, Scotia-Fundy Region

Exhibit 6.10

To interpret changes in prices received for the lobster catch, consideration of trends in the amount of lobster landed is essential. For products such as haddock, halibut, and scallops, prices could be expected to increase because less was caught and buyers competed for the smaller catches coming to the market. Health and other considerations with respect to seafood, have further added to the demand for an already diminishing supply. This has not been the case for lobster; total supply has consistently increased every year since 1980. Despite this, average Scotia-Fundy ex-vessel prices have increased in current dollars in every year since 1981, and in constant dollars in every year since 1982 (Exhibit 6.11).



Source: Fisheries and Oceans, Scotia-Fundy Region

Exhibit 6.11

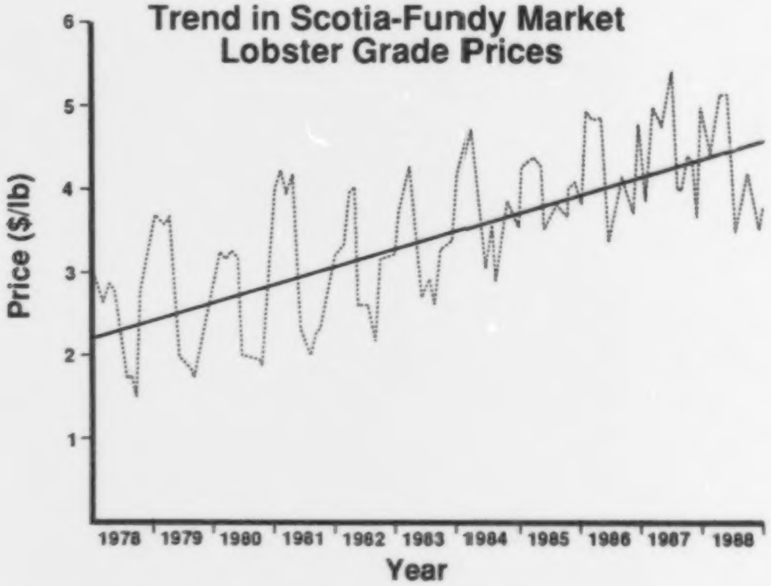
A complication in the analysis of market price trends in the major Canadian export markets over the past decade are the large changes in relative values of different currencies. The U.S. dollar has reached historic highs and lows against the Yen and European currencies during recent years and has also varied considerably in value in relation to the Canadian dollar.

Prices for Scotia-Fundy' s lobster were about the same in real terms in 1987 as they were in 1978 (Exhibit 6.11). Current dollar prices during the 1978-81 recession rose and fell with changes in supply. The Canadian dollar was relatively stable at $0.84 U.S. during this period. Inflation rates reached 12.5% in 1981 and caused the constant dollar value of lobster to fall sharply. By 1985-86 the dollar weakened to $0.72 U.S. helping to boost prices. Inflation also fell to 4%, which caused an increase in the real price of lobster. These trends continued, supported by high demand and low inflation, into 1987 in spite of a strengthening of the Canadian dollar to $0.76.

Total Canadian and U.S. landings increased by 70% between 1978 and 1987. This price-supply relationship suggests that a reduction in supply would cause an increase in the price consumers are willing to pay. A strengthening Canadian dollar will, however, reduce the price fishermen receive from foreign sales.

6.3.2 Trends in Ex-Vessel Prices in Scotia-Fundy

Despite marked seasonal variations in prices there was a clear upward trend in the average ex-vessel price for lobster in Scotia-Fundy from 1978 to 1987 (Exhibit 6.12). During the last 10 years there has been an average annual increase in price of 7.7%. Another market characteristic evident from Exhibit 6.12 is a steady reduction in the swing of the annual variation in ex-vessel price. This may reflect the efficiency of pound operators in holding lobsters and buffering price changes which occur because of fluctuations in supply. Accompanying the reduction in seasonal price changes has been the emergence of multiple price peaks and troughs within a year. This suggests a greater sensitivity of price to supply over very short terms.



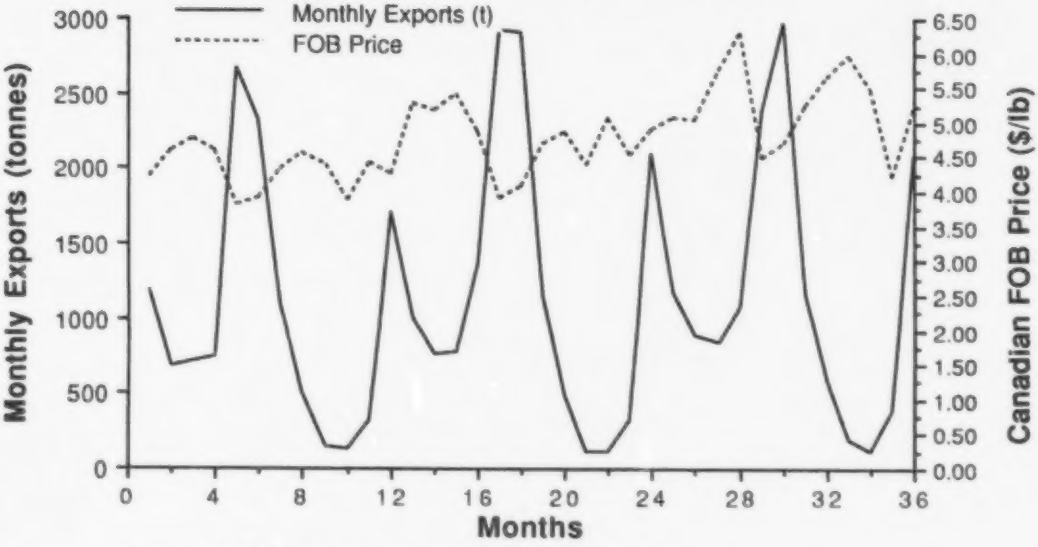
Source: Fisheries and Oceans, Scotia-Fundy Region

Exhibit 6.12

Interpretation of trends in prices at the ex-vessel level is complicated by variations in price from month to month. This occurs because of seasonal variations in demand that do not exactly match seasonal changes in supply. When demand increases relative to supply, prices increase and vice versa. On top of this, demand for the different grades depends on the season so that variations occur in the price of grades relative to each other. In New England, a demand peak occurs during the tourist season (late summer) and again at Christmas. This latter period is also a time of peak demand in several European markets.

Live supplies to the U.S. markets from all sources, are generally lowest in February, rise gradually through April, increase rapidly in May and remain at a high level through October. Supplies decline in November, then increase again for December. Supply of Canadian lobsters moderates fluctuations in U.S. supply which has a single peak in late summer or early fall. Canadian landings have two peaks, one in May-June and a smaller one in December. The bulk of Canadian exports to the U.S. coincides with the rise in summer demand, and declines to near zero by the time U.S. landings reach a peak and then increases again in December, when the lobster fishery in southwestern Nova Scotia opens. Because the Canadian catch supplements relatively large U.S. landings, the variation in the quantity of exports is much greater than variation in Canadian F.O.B. price. (Exhibit 6.13).

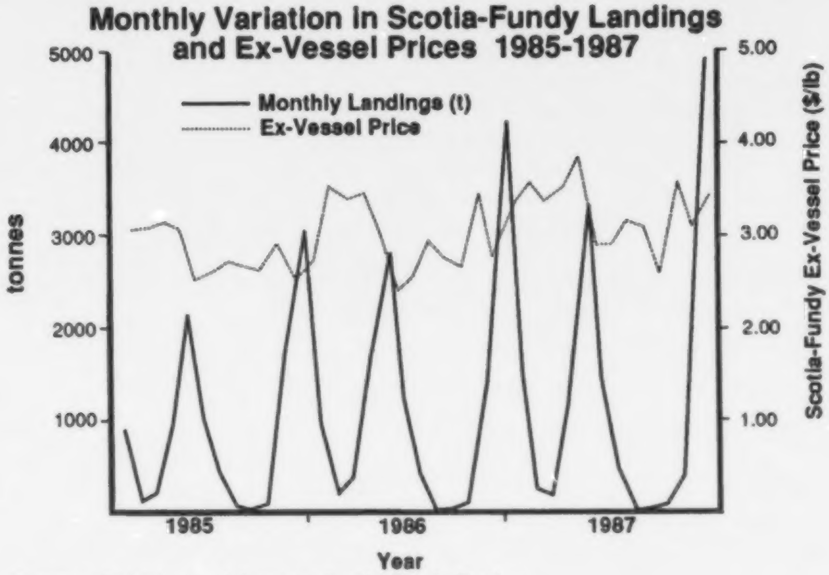
Monthly Canadian Lobster Exports to the USA and Average FOB Prices 1985-1987



Source: Fisheries and Oceans, Scotia-Fundy Region

Exhibit 6.13

Exhibit 6.14 shows a similar plot, but for Scotia-Fundy landings for market grade lobster. Here again prices show much more stability than supply. This suggests that the potential for increasing revenue by changing the time of sale to U.S. markets or by modifying fishing season dates may be limited. Further analysis of the relationships could be a component of future market studies.



Source: Fisheries and Oceans, Scotia-Fundy Region

Exhibit 6.14

There are many complications to accurate and detailed analysis of short-term ex-vessel price changes. Fishermen may hold catch for higher prices. Fishermen and buyers make arrangements of convenience for their settlements, which can distort the time of catch. Some buyers make "end-of-season" adjustments in order to maintain good relations with the fishermen.

6.3.3 Lobster Grades and Price Trends

Fishermen in Scotia-Fundy are paid for their lobster according to three grades: canners, markets, and jumbos. Lobsters graded as "markets" when purchased from fishermen are divided by weight into 5 wholesale grades (chix, eights, quarters, halves, and selects), for U.S. markets (Exhibit 6.15). Higher prices per pound are paid for larger grades of lobster on both markets.

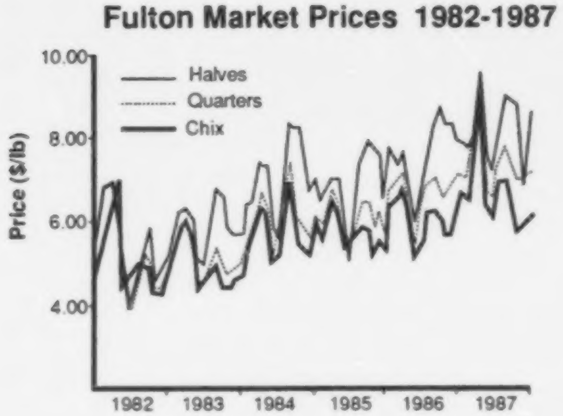
DOCKSIDE AND WHOLESALE GRADE CATEGORIES OF LOBSTER
BY WEIGHT AND CARAPACE LENGTH

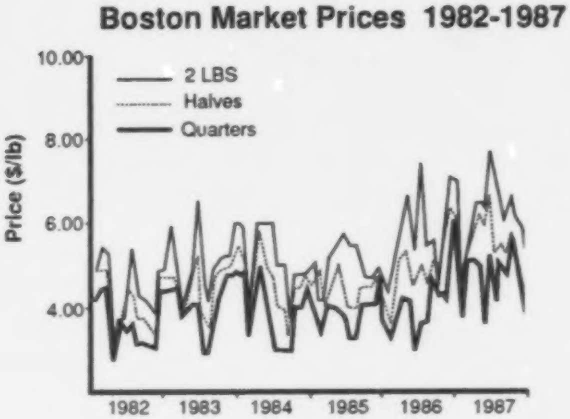
Dockside Ex-Vessel (1987 $/lb)	**Wholesale**	**Weight (lbs)**	**Carapace Size**	
			Inches	**(mm)**
Canners ($2.60)	Canners	0.60 - 0.95	2-3/4" – 3-3/16"	(70– 80)
Markets ($4.41)	Chix + Eights Quarters Halves Selects	0.95 - 1.25 1.25 - 1.49 1.50 - 1.99 2 - 3	3-3/16" – 3-1/2" 3-1/2" – 3-3/4" 3-3/4" – 4-5/16" 4-5/16" – 4-13/16"	(81– 89) (90– 95) (96–104) (105–123)
Jumbos ($3.08)	Jumbos	3 and up	4-7/8" and up	(123 and up)

Exhibit 6.15

If an increase in the legal minimum carapace size was introduced and canners were left to grow to be caught as markets, fishermen would feel the price impact immediately. The average ex-vessel price of markets was 70% higher than canners in 1987, although some of this difference would be due to time of catch (Exhibit 6.15). There are concerns that a regulatory change affecting canners would cause a large increase in the supply of market size lobster which could reduce their price. While this could occur, recent trends show real price increases for market grades have been achieved since 1982 in spite of dramatic increases in supply (Exhibit 6.11).

The seasonal and annual trend in U.S. prices from 1982 to 1987 is available for 3 wholesale grades on New York's Fulton Market (Exhibit 6.16) and on the Boston Market (Exhibit 6.17).





Source: Derived Using *Seafood Price-Current*, Toms River, N.J.

Exhibit 6.16

Exhibit 6.17

Not only have average prices increased, but the price differential between grades has also been increasing. This is shown more clearly for Fulton by plotting price trends in the ratio of quarters to chix (Exhibit 6.18), and the ratio between halves and chix (Exhibit 6.19).

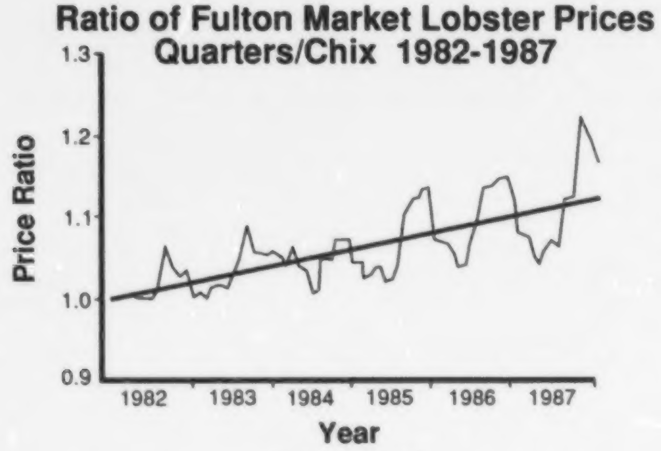

Ratio of Fulton Market Lobster Prices
Quarters/Chix 1982-1987

Exhibit 6.18

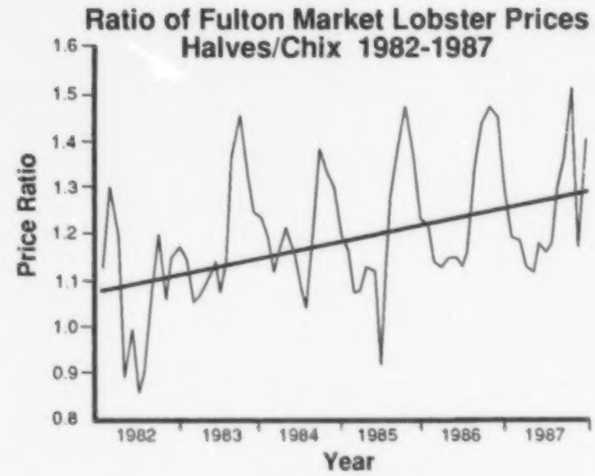

Ratio of Fulton Market Lobster Prices
Halves/Chix 1982-1987

Exhibit 6.19

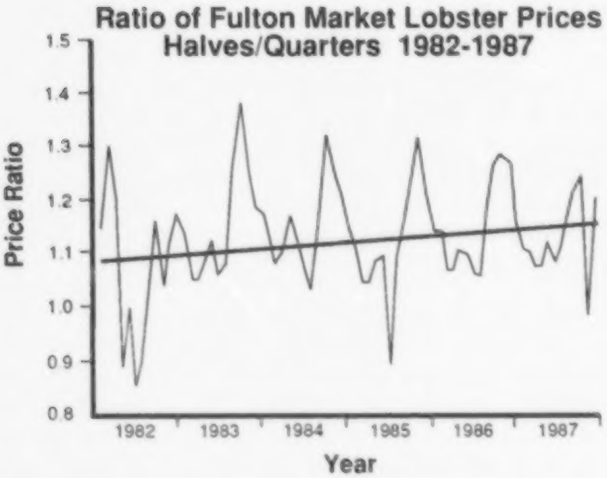
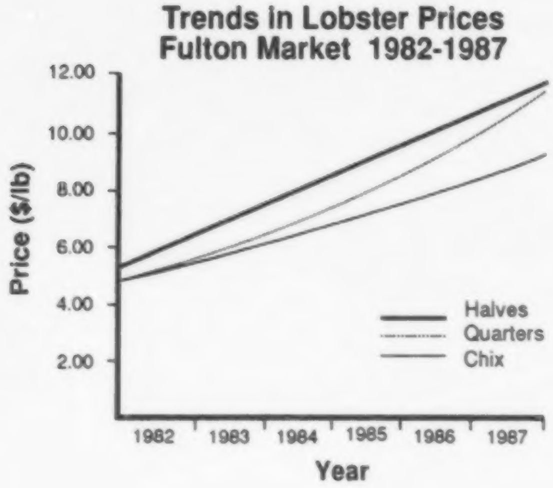
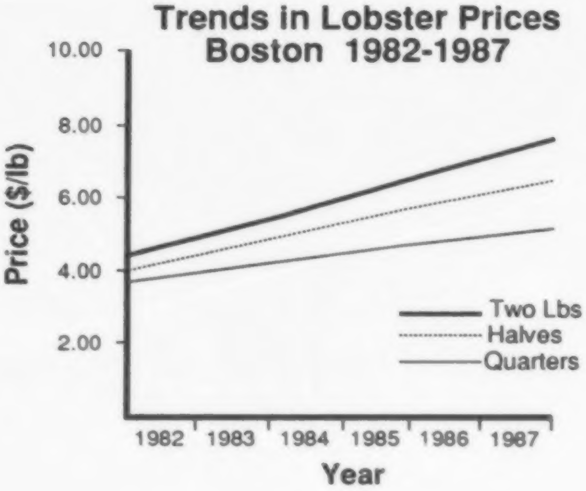

Ratio of Fulton Market Lobster Prices
Halves/Quarters 1982-1987

Exhibit 6.20

The high and low points on the graphs represent the shift in price differential by month. The seasonal variation is more pronounced in the halves/chix ratio (Exhibit 6.19) than for the quarters/chix (Exhibit 6.18). The upward slope of the dotted line indicates a growing market preference for the larger grades. The relation between halves and quarters (Exhibit 6.20) has strong seasonal characteristics and a less pronounced upward trending preference for the larger size.

Exhibit 6.21 shows average price trend curves in dollar terms for the chix, quarters and halves grades on the Fulton Market; Exhibit 6.22 shows similar curves for the price trends of quarters, halves and 2 lb grades on the Boston Market. The upward trends are clear.





Source: Derived Using *Seafood Price Current*, Toms River, N.J.

Exhibit 6.21

Exhibit 6.22

A final feature evident by comparing Exhibit 6.21 and 6.22 is the price differential between New York and Boston. Prices obtained in New York are higher than those obtained in Boston, although the additional cost of doing business in New York may account for some of the difference.

The landed weight per lobster caught would increase if the minimum carapace size was increased. As a result, even with no initial price change at the ex-vessel level, revenues received by fishermen would increase. Over time the competition for lobsters between buyers would translate the increased revenue from grade "step-up" at the wholesale level into higher prices for fishermen. Competition and a widening gap between prices for wholesale grades could, over time, cause finer-scale grading to develop at the fisherman/buyer levels. If this market response occurred the preference for larger lobster could compound the benefits of a carapace size increase by adding increased price to increased volume.

6.3.4 Comparison Between Ex-Vessel and Wholesale Price Trends

A comparison of relative trends in prices occurring at the ex-vessel level with those in the U.S. wholesale markets, will show whether fishermen are obtaining an increasing or decreasing proportion of the wholesale price. If prices have risen more quickly in the U.S. than at the ex-vessel level in the Scotia-Fundy Region, then a greater share of end revenues will have gone to the wholesale sector. Conversely, if prices paid at the ex-vessel level have increased more quickly than those in the Boston or New York wholesale market price, then, fishermen will have been obtaining a progressively greater share of the market price relative to the wholesalers. Exhibit 6.22 shows the results of comparisons between price trends. If changes in the exchange rate are ignored, ex-vessel prices have increased more rapidly than Boston prices, and more rapidly than the smaller grades on the New York market. When rate changes are considered, Scotia-Fundy ex-vessel prices have increased more rapidly than the lower grades on the Boston market, and chix grade on the New York market, but less than the higher grades.

TREND ADJUSTED PRICES FOR MID-YEAR, 1982 and 1987

Market / Product	1982	1987	% Increase
Scotia-Fundy			
Ex-vessel "markets"			
$ Canadian	2.97	4.29	44.3
$ U.S.	2.41	3.13	30.0
Boston ($U.S.)			
Quarters	3.71	4.40	18.7
Halves	4.10	5.19	26.7
2 lb	4.45	5.88	32.2
Fulton (New York - $ U.S.)			
Chix	4.93	6.43	30.5
Quarters	4.97	7.11	43.1
Halves	5.40	8.10	50.1

Exhibit 6.23

Care should be taken in interpreting these statistics because the relative supply of the different grades is unknown, and changes in supply could account for differential changes in price among grades. Direct comparisons are also complicated by fluctuations in currency exchange. However, fishermen do appear to have more than gained the additional revenues from the decline in the Canadian dollar. From 1982 to 1987, the dollar, on average declined in value by 11.1%; on this basis alone, revenues should have increased 11% above the U.S. market trend. In fact, the increase was 14% above the trend (calculated in U.S. dollars). Because most lobster supply is in the smaller wholesale grades, it is reasonable to conclude that fishermen have been doing slightly better price-wise than the wholesale market price for medium grades, and much better in the quarter grade than the Boston trend, (30% compared with 18.7%).

6.4 Discussion

The demand for lobster has been strong, and prices for premium grades appear to be increasing relative to that for the lower value, smaller grades. Because of the importance of export markets, prices will continue to be affected by the strength of the Canadian dollar. Nonetheless, unless a recession occurs that diminishes sales to the premium restaurant trade, an important market for lobsters, demand should continue to remain strong for Canadian lobsters. This has important implications for management actions that may be taken in the future to enhance the value of the fishery.

A management action to increase future catches that results in a temporary reduction in landings may not cause a corresponding reduction in revenues. Rather, as happened in the Gulf snow crab fishery, lower supplies could increase prices and thus protect revenues. Further, the continuing upward trend in market preference for the larger grades (halves, selects, etc.) in the U.S. market indicates that market prices would remain strong even with additional supplies of premium grades that would follow an increase in minimum carapace size.

6.5 1988 Market Update

Lobster prices peaked in the U.S. markets in 1987. A combination of consumer resistance to high prices and continued high levels of landings led to an easing of prices in world markets in 1988. The average annual Scotia-Fundy lobster price paid at dockside fell by 13% from 1987 to 1988.

The Canadian dollar strengthened against the U.S. dollar by 8% from 1987 to 1988. Since 80% of our lobster exports go to the U.S., this could be responsible for about 6% of the 13% reduction.

U.S. Lobster landings were stronger than normal last year, expecialy in the fall, and anecdotal evidence suggested that the lobsters were hardshell and of better quality than usual. Lower-priced U.S. live lobster continued to penetrate European markets in 1988, providing stiff competition for Canadian lobster exporters. A growing demand for lobster has been observed in Europe and Japan while U.S. demand remains steady.

7 GOVERNMENT'S ROLE IN MANAGING THE LOBSTER FISHERY

7.1 History of Lobster Fishery Management

The Canadian lobster fishery began in the mid 1800's with no government involvement in resource conservation or industry viability. Government regulation began in response to general concerns about over-fishing. The first regulation was an 1873 Order in Council prohibiting capture of soft-shelled lobsters, egg-bearing females, and lobsters less than 1-1/2 pounds. Some fishermen and cannery operators opposed government intervention and mounted opposition which resulted in the more flexible regulation of a closed season for soft-shelled lobsters and a lobster harvesting size restriction of 9" total length. During 1879 an 8 month closed season for Bay of Fundy and southern and eastern sections of Nova Scotia was introduced.

Six fishery districts, each with its own season, were created in 1900, size limits were adjusted; seasons were modified and restrictions placed on fishing in less than two fathoms of water.

Pressure from cannery operators resulted in regulated size limits being abolished (excluding Charlotte and Saint John counties, New Brunswick) in 1909. Lath spacing of 1-1/4" and 3" mesh netting in heads were introduced. Licensing was introduced in 1918.

By 1932, it became obvious that the average size of lobsters harvested was getting smaller and the 9" minimum total size limit was re-introduced. The measure was changed to a 3-1/16" carapace length limit in the Bay of Fundy, southwestern Nova Scotia, and parts of Cape Breton in 1934. Regulations preventing fishermen from fishing lobster in more than one season in any year were enacted as well. In 1947, District 6A was created in Richmond County. By this time, districts included 1, 2, 3, and 4 west (southwest Nova Scotia and Bay of Fundy), 4 east, 5, 6A, 6B, and 7A in the remainder of Nova Scotia.

The 1940's and 1950's saw attempts to raise size limits. In the early 1950's the size limit for the southeastern part of the region was raised to 3-1/8"and in 1952 to 3-3/16". The minimum size was raised to 7" overall and then 2-1/2" carapace length in the Gulf. These changes seem to have been in response to a change in size regulations in 1951 by the state of Massachusetts.

By the mid-1950's, far-sighted fishermen of Fourchu and Lismore in Nova Scotia, not satisfied with government efforts to improve viability, developed a self-imposed trap limit. The effect was to increase fishermen's net income by cutting costs without reducing catch. Based in part on this success, the first government-imposed trap limit of 250 traps per boat was put in place in District 8 in 1966. By 1968, limits of 300, 375 and 400 were in place throughout the Maritimes. Also in 1968, limited entry was introduced region-wide and partnership licences were created. The boat, rather than the fisherman, was licensed in 1969 and licences were categorized as either "A" (full-time) or "B" (part-time). During 1971 the offshore lobster fishery was created.

In 1974 the federal Minister of Fisheries, responding to excessive pressure on resources, commissioned a Task Force to examine all aspects of the lobster fishery. The study, released in March 1975, contained major recommendations including changes in the categorization of fishermen. A licence buy-back program was undertaken in the years that followed. Licensing was revamped in 1977 and fishermen were categorized into "A", "B", and "C" classes. All category "C" licences were phased out by 1979. In 1982 the practice of upgrading "B" licences to "A" licences, when fishermen ceased employment outside the lobster fishery, was abandoned and "B" licences were made non-transferable. The *Lobster Fishery Regulations* were consolidated into the *Atlantic Fishery Regulations 1985*. Sections which conflicted with the *Charter of Rights and Freedoms* were eliminated.

A formal consultation process was developed for the Scotia-Fundy lobster fishery in 1984. The process provides opportunities for representatives of industry to participate in management.

7.2 Lobster Management Regulations

7.2.1 Limited Entry Licensing

Limited entry licensing is used to control access to a fishery. The system restricts licences to those qualified fishermen who held them in the preceding year or who had licences transferred to them from another fisherman. The purpose of the regulation is to maintain economic returns to licence holders and their crews by controlling the numbers of vessels in the fishery, thereby keeping capital and operating costs down. It also provides a primary level of effort control to limit fishing mortality.

A full-time fisherman without a lobster licence can receive a transfer of a licence from a lobster fisherman who is leaving the fishery subject to ministerial approval. Only category "A" licences are transferable; the transfer of category "B" licences has not been permitted since 1982. Partnership licences may also be transferred but the partnership must be dissolved before the transfer is allowed. Licence transfers are permitted only within a particular lobster fishing area (LFA). However, a fisherman with a valid licence has the opportunity to fish from any port within the area specified on his/her licence.

The market value of a lobster licence ranges from less than $10,000 to as much as $50,000. This cost and the capital investment in vessels and equipment are constraints for young fishermen wishing to own their operation.

An applicant who is dissatisfied with a Departmental licensing decision has the right of appeal. Categorization appeal committees at the local level are made up of fishermen residing in each of the three Scotia-Fundy management areas plus a Departmental appointee to facilitate committee action. The second level of appeal has a non-fisherman membership drawn from the Region, with a secretary appointed by the Department. The Atlantic Fisheries Licensing Appeal Board, the third level, is completely independent of the Department.

Each appeal committee can review all pertinent information, with appellants having the right of attending in person or through representation. Each can recommend that in the case of disputed categorization the appellant's category be maintained or changed. When a request is denied at one committee level, it is the duty of the committee to advise the appellant how to take the appeal to the next level should he/she wish to do so. The final level of appeal, the Atlantic Fisheries Licence Appeal Board makes recommendations directly to the Minister who makes the final decision.

7.2.2 Trap Limits and Tagging

The benefits of limited entry licensing could not be achieved if each licence holder increased his level of effort without limit. Trap limits were introduced to limit the effort and costs of individual licence holders. A minimal number of traps is required to catch the available lobster in a given area. Fishing additional traps adds cost but yields no extra revenue. In a fishery without limits, fishing more traps than your neighbour provides a short term advantage if the additional catch exceeds the additional cost. However, soon everyone adopts the same approach and the number of traps quickly exceeds the minimum required. The costs incurred reduce the total net income from the fishery and everyone is worse off. Lower trap limits, if observed by all fishermen, increase average catch per trap haul and prolong the period at the start of the season when catches per day are highest.

Current trap limits in Scotia-Fundy are above ideal levels but they do cap operating costs. The average annual cost of fishing a trap in the Region is estimated at $17.00 in 1987. The overall impact on income can best be described with an example:

- 10 fishermen fish a ground fully with 100 traps each and earn a gross of $200,000.
- Each gets a 1/10 share of the gross from the catch equal to $20,000.
- 1 of the 10 decides it is in his best interest to fish 200 traps.
- Now the total gross is divided into 11 shares of $18,200 each (9 get 1 share each; 1 gets 2 shares).

- The fisherman with 2 shares is much better off, increasing his gross to $36,400 and his cost by only $1,700, but the other 9 are worse off.
- Before long each of the other fishermen, feeling short-changed, acquire an additional 100 traps, increasing annual costs by $1,700 per fisherman.
- The catch is again shared equally – each returns to the original $20,000 gross share he had in the first place.
- BUT EVERY FISHERMAN'S COSTS TO ACQUIRE BAIT, AND TO HAUL AND MAINTAIN HIS TRAPS HAVE DOUBLED, AND NET INCOMES HAVE REDUCED BY $1,700 EACH.
- This competition can go on until all of the advantages of being the first to fish extra traps are used up.

Trap limits are enforced by using plastic tags to identify legally set traps. Each fisherman receives a set of tags equal to the number of traps allowed for his lobster area. These must be attached to the frame of the trap. The tags are coded and traceable to a specific fisherman. Fishermen are prohibited from fishing one another's traps or tags. Regulations also require that every lobster buoy display the CFV number of the fishing vessel used to tend the attached trap(s). A properly set lobster trap should be marked with a numbered tag attached to the trap and with the CFV number of vessel displayed on the buoy.

Enforcement of trap limits has become one of the most controversial problems facing the lobster fishery in Scotia-Fundy. Trap tags can only be easily checked at the start of season before traps are put in the water. During an open lobster season, fishery officers may only haul traps to check for tags if there are reasonable and probable grounds to believe the traps are not tagged. The number of lobster traps set in the Region (over 900,000) and the vast area of the grounds make finding untagged gear during the season difficult. Most often, when untagged traps are found, ownership cannot be determined. Traps are often set far from shore where it is impossible to watch suspect gear and wait for someone to come by and haul it.

Fishermen who set illegal traps often use buoys of several different colours, making it difficult to match traps to a particular boat. A requirement to have CFV numbers on buoys has not been applied. A more comprehensive regulation would help to deter the fishing of untagged traps. If identity cannot be proven, the traps are destroyed but the violator goes unpunished. In cases where charges have been laid, convictions were difficult to obtain. During 1986 and 1987, 12 of 24 charges for fishing with untagged lobster traps in Scotia-Fundy were either withdrawn or dismissed. Often this was due to what was deemed a faulty tag.

Fishermen strongly favour effective trap limits. They voiced this opinion in the survey done for this study, as they have many times in the past. The Maritime Fishermen's Union and DFO are undertaking a joint study to develop a foolproof trap tag.

7.2.3 Carapace Size Restriction

The minimum carapace size restrictions are the most important regulations for protecting lobster stocks and for maximizing the total yield in both weight and value from the fishery. The current minimum limit of 3-3/16" which applies to most of the Scotia-Fundy Region results in the capture of a majority of lobster at age 5 to 8 years. Most are caught before they are sexually mature. This current legal minimum size will be increased by 2/16 inches to match new U.S. regulations.

Enforcement of the regulation has become a central feature of the fishery. Fishermen are expected to measure their catch and return undersize lobster, to the water. Fishery officers can measure lobsters at dockside or in holding facilities. Proper documentation is required for any undersized lobster held in pounds but sub-legal size lobster from other areas add complexity to enforcement. Changes to the legal minimum size would not complicate the enforceability of the regulation.

The introduction of vents to allow undersized lobster to escape from traps would reduce mortality and simplify enforcement.

7.2.4 Seasons

Seasons restricting harvesting allow lobsters time to molt, mate and grow. They limit fishing effort by reducing the number of days fished. Closed seasons are meant to leave harvestable lobster in the water at those times of the year when market conditions are poor or when lobsters are soft shelled and poor in quality. The break between seasons allows grounds to replenish and provide good catches for a certain period at the start of the season.

Seasons are well understood and supported by fishermen in most areas. Enforcement is straightforward – no fishing when the season is closed.

7.2.5 Berried Lobster Restriction

This regulation requires the return to the water of female lobsters which have eggs attached to the outer body. The measure protects egg supply. Since adult lobsters suffer low natural mortality and high exploitation, the female which is returned to the water is likely to be recaptured in a subsequent year at a larger size. The regulation is strongly endorsed by fishermen.

Some individuals scrub the eggs off berried lobsters in order to sell them. Improved testing techniques allow scrubbed lobster to be identified at dockside and in pounds. Complications can occur when legally purchased females extrude their eggs while in lobster pounds. These circumstances have been accommodated in the past by issuing special licences to hold berried females.

7.3 DFO Programs in Scotia-Fundy which Support the Lobster Fishery

Programs in support of regulations aim first at understanding the biological, environmental, and socio-economic factors related to the fishery, and secondly at evaluating the impacts on stocks and on industry performance. Using this research, regulations can be modified through the management process. DFO also has responsibility for enforcing regulations. These programs are discussed further in this chapter.

7.3.1 Biological and Environmental Research

The biological research program provides support for conserving and enhancing the lobster resource and its habitat. Research and advisory documents are provided through the Canadian Atlantic Fisheries Scientific Committee (CAFSAC). These contain assessments of current stock conditions as well as progress reports on research of the biological processes related to lobster.

Data collection activities in support of biological research include sampling of commercial catches both at sea and in port for biological characteristics. Fishermen's log records are analyzed to determine the location of fishing and catch per unit of effort. Tagging studies are used to determine growth rates, distribution, and movement characteristics. They also help identify lobster populations. The data are used to estimate the growth of stocks and their and exploitation rates.

The program will continue to support studies into the interaction between inshore and offshore stocks and the factors which explain change in lobster recruitment levels over time, including environmental and climatic shifts as well as man-induced factors.

The environmental research program provides information on the physical and chemical oceanography of the Region. Annual overviews of the environmental conditions are provided from available data. A long-term temperature monitoring program has been underway in several nearshore areas since the early 1980's to help establish both mean seasonal conditions and year to year variability.

Field and modelling studies of the waters off southwestern Nova Scotia and Georges Bank have been undertaken to determine the primary forcing mechanisms of the currents. These investigations, coupled with information on the vertical distributions of lobster larvae, will help to determine if there is a connection between inshore and offshore lobster stocks through larval drift.

Future studies will continue to focus on the determination of the important physical and chemical mechanisms controlling temperature, salinity and current variability on important lobster grounds. Closely integrated research programs between lobster biologists and physical and chemical oceanographers will better define the role of the environment in determining lobster abundance, availablility, and catchability.

7.3.2 Economic Research

This program provides analysis of the economic performance of the lobster fishery at the vessel and industry level. It assesses the market environment in which industry functions and tracks the contribution of the fishery to the overall regional economy. Such analyses are regularly provided as input to consultative committees, and are used to adjust management programs and evaluate the success of policies.

The Economic Research program is dependent on data to perform these analyses. The data are obtained through the catch, landing, licensing, and plant products information systems through which DFO tracks the commercial fisheries. Special surveys are used to get data on costs, earnings, income and industry capacity. Data on markets, prices, and exports, and information on general economics and trends and community dynamics collected by other agencies such as Statistics Canada are also used.

The program will continue to monitor economic performance but other work is also important to the lobster fishery. Supply/demand/price relationships require research on an Atlantic-wide basis. Assessments of the costs and benefits of alternative management options must be developed for use in the consultative process between fishermen and the Department.

7.3.3 Resource Conservation and Allocation for Harvest

The Resource Allocation program combines biological and economic advice with inputs from representatives of the fishing industry, and from other governments to develop formal management plans to guide the lobster fishery. For the offshore fishery the program sets restrictions such as quota limits. For inshore lobsters, it prescribes, among other fishery restrictions, seasons, trap limits, and carapace size minimums.

The consultation process, used to receive government/ industry inputs, is formalized through advisory committees. Area Lobster Advisory Committees, made up of local representatives, provincial government representatives, and DFO staff, serve as focal points for discussion of long-term biological and economic measures such as licensing policies, size limitations, gear restrictions and trap limits and of short-term, area-specific matters which can change on an annual basis such as opening dates, procedures, and closures. The Regional Lobster Advisory Committees with representatives from area committees, processors, provincial governments, and DFO staff, serve as the focal points for medium to long-term, region-wide policy matters relating to overall stock conservation and protection, socio-economic considerations and general regulatory matters.

The regulations section drafts and seeks approval for new and revised acts and regulations required by management plans. The licensing unit administers lobster licensing policy and procedures, including the annual process of issuing licences, arranging transfers, and conducting appeals. The quota management unit monitors catch levels of the offshore lobster fishery and recommends closures.

7.3.4. Surveillance and Enforcement

This program promotes, monitors and ensures compliance with Acts, Regulations, policies, management practices and specific fishing plans applicable to lobster and other fisheries. It includes *prevention-oriented techniques* such as promoting general awareness of activities related to fishing, conducting fishery-related community projects, holding meetings with fishermen, explaining the management regime, patrols, settling disputes, issuing and following-up warnings. It also includes *Prosecution-oriented measures* such as patrolling (enforcement checks), apprehending and arresting violators, seizing illegal catches, gear, vehicles, etc., arranging forfeiture and licence suspension or cancellation orders, preparing cases, and attending court.

The balance between prevention and prosecution measures is important. Most often the decision to give a warning or initiate a prosecution is at the discretion of the individual Fishery Officer when the violator is encountered. Prosecutorial discretion is one of the most important judgements Fishery Officers are required to make. These professional judgements, in large part, determine the overall balance between the prevention and prosecution approaches and are critical to the effectiveness of the surveillance and enforcement program.

The amount of time spent on lobster enforcement is affected by the demands from other fisheries. In recent years the complexity of the quota system has drawn increasing amounts of Officer attention, particularly for groundfish. The scallop fishery in the Bay of Fundy has experienced major enforcement problems. The herring fishery often requires 24-hour surveillance of principal landing points. Clams, oysters, and mussels must be checked on a much more frequent basis as a result of the shellfish alert in 1987-88.

As the complexity of management regimes increases, Officers are required to spend more time on administrative functions. Preparation time for court has increased due to a decrease in the number of guilty pleas and increasingly severe penalties. Taken together, these factors have substantially reduced the time spent on the wharf and water. Area and regional program managers are continually striving to balance these competing demands for time and money.

The total number of charges initiated over the past four years has remained fairly constant for most LFA's (Exhibit 7.1). Total charges laid by Officers are double those of ten years ago. Over 85% of lobster cases taken before courts result in convictions (Exhibit 7.2). A major factor in deterring potential violators is the fine imposed. Although fines are increasing, they are still low. The power to suspend the licence of a lobster fisherman convicted of a violation now rests solely with the courts.

SCOTIA-FUNDY REGION
NUMBER CHARGES AND RESULTS BY LFA
(LOBSTER ONLY)
1984 - 1987

Area	27	28	29	30	31	32	33	34	35	36	38
Charges	47	2	14	1	27	14	150	74	22	21	0
Withdrawn	5	0	0	0	0	1	10	7	4	1	0
Dismissed	3	1	1	0	0	0	24	25	2	2	0
Convictions	39	1	13	1	27	13	117	42	16	18	0
Avg Fine (in $)	549	250	911	1,500	484	773	612	963	700	184	0
Suspensions	7	0	4	1	3	2	1	0	1	0	0
Avg Suspension in Days	3.3	0	7	14	14	4	14	0	7	0	0

Exhibit 7.1

SCOTIA-FUNDY REGION
NUMBER COMMON CHARGES FOR WHICH CONVICTION RECEIVED BY LFA
(LOBSTER ONLY)
1984 - 1987

Area	27	28	29	30	31	32	33	34	35	36	38
Untagged Traps	3	1	1	0	2	3	5	1	3	0	0
Short Lobsters	17	0	10	1	12	3	46	16	5	6	0
Fishing out of Season	14	0	2	0	10	4	45	23	3	7	0
Berried Females	1	0	0	0	2	1	0	0	2	4	0
Other	5	0	0	0	1	2	21	2	3	1	0

Exhibit 7.2

7.4 The Costs of DFO Programs

Costs of programs described in Section 7.2 are covered by the annual DFO budget. Costs of lobster management in Scotia-Fundy Region are presented in this section in relation to the costs of all other regional programs. The total regional budget of $114.3 million can be separated into ten categories (Exhibit 7.3). **Fisheries Harvest Management** for all fisheries account for 34% of the budget. Oceanographic and Hydrographic programs, which operate throughout the North Atlantic, account for about 29%. Small Craft Harbours accounts for 14% and the other six categories the remainder.

The costs referred to in this section are annual regional expenditures. They do *not* include depreciation, cost of capital or related costs incurred by DFO, Ottawa. In areas where the formal departmental accounting system could not directly support these types of analyses, figures were derived from the informal records and estimates of managers. Operational expenditures include salaries and wages paid to staff, and annual operating, maintenance and capital expenditures. Overhead includes expenditures for centralized regional personnel, financial, material management and other general administrative services pro-rated to individual activities.

SCOTIA-FUNDY REGION
1987-88 FISCAL YEAR EXPENDITURES
HIGHLIGHTING FISHERIES HARVEST MANAGEMENT COSTS

	Operational	Overhead ($ millions)	Total	(%)
Fisheries Harvest Management (including Inland & Foreign Fisheries)	33.9	4.8	38.7	34
Habitat Management	1.9	0.3	2.2	2
Inspection	4.9	0.7	5.6	5
Special Services to Fishing Industry	7.5	1.0	8.5	7
Service to Aquaculture	6.9	1.0	7.9	7
Small Craft Harbours	14.4	2.0	16.4	14
Hydrographics	9.8	1.4	11.2	10
Oceanographics	18.7	2.7	21.4	19
Service to Other DFO Regions	1.9	0.3	2.2	2
Service to Other Departments	0.2	-	0.2	-
Total Regional Expenditures	**100.1**	**14.2**	**114.3**	**100**

Source: Fisheries and Oceans, Scotia-Fundy Region.

Exhibit 7.3

Operational costs of $33.9 million for **Fisheries Harvest Management** are subdivided among the programs described in Section 7.2 for each major fishery (Exhibit 7.4). Groundfish accounts for 31% of all Fisheries Harvest Management costs and lobster 22%. Subdividing the costs by program, research accounts for 41% and allocation and enforcement for 59%.

Resource Conservation and Allocation includes Resource Allocation/Consultation, Regulations, Licensing and Quota Monitoring. Biological Research and Surveillance and Enforcement figures reflect an appropriate portion of the costs of operating vessels in support of these activities. None of the figures includes capital costs such as depreciation for buildings, equipment and vessels, or costs of capital estimated, in 1987, at about $9.2 million per year for the Fisheries Harvest Management portion of regional programs.

SCOTIA-FUNDY REGION
FISHERIES HARVEST MANAGEMENT
EXPENDITURES BY MAJOR SPECIES & MANAGEMENT ACTIVITY
1987-88 FISCAL YEAR

	$ Millions					
	Research		Resource Conservation & Allocation	Surveillance & Enforcement	**Total**	**% by Species**
	Biological	Economic				
Groundfish	5.3	0.5	1.4	4.8	12.0	31
LOBSTER	**2.4**	**0.3**	**1.0**	**4.8**	**8.5**	**22**
Scallop	1.1	0.3	0.6	1.5	3.5	9
Herring	2.7	0.1	0.6	0.9	4.3	11
Other Species	2.8	0.4	2.2	(& sovereignty) 5.0	10.4	27
Total	14.3	1.6	5.8	17.0	38.7	
% by Program	37	4	15	44		100

This assignment of costs to major fisheries is preliminary; a comprehensive review of expenditures by species is now under way. Revised figures will be included in the final report.

Exhibit 7.4

In the past decade governments in Canada and elsewhere around the world, under pressure to address the longer-term negative economic and social impacts of large government deficits, have been cutting costs. Over the same period, inflation has reduced the purchasing power of government agencies as it has of everyone else.

These trends have had the following effects on the resources provided to Scotia-Fundy Region since 1985: personnel years available for all activities have been reduced by about 13%; operations and maintenance purchasing power for such items as fuel, utilities, lobster tags and other supplies has been reduced by approximately 25%; and capital purchasing power, which affects the replacement of equipment, acquisition of new equipment, renovation and major repair to various assets, has been reduced by nearly 50%.

DFO, like other departments, is under on-going pressure from the government to recover a larger portion of the cost of implementing programs from those who benefit from the programs. Further budget reductions may occur if cost-recovery targets are not met.

A recent DFO Strategic Outlooks Workshop concluded that, because of the above trends and the federal government's economic policies, no relief is in sight and, indeed, significant reductions in funding may continue.

7.5 More Service to Clients from Fewer Resources

Extraordinary measures to maintain programs and levels of service in the face of reduced resources continue to be taken throughout DFO. Lobster Fishery Surveillance and Enforcement programs in the Scotia-Fundy Region provide some examples.

A Zenith 40000 number allows citizens to call toll free 24 hours a day to report suspected fisheries violations. Calls are passed to the Fishery Officer nearest the problem for investigation. Callers using the service are not required to leave their name. But if they wish an Officer will contact them with results. Helicopters, which allow fewer staff to cover a much wider area,were used successfully in lobster poaching cases during spring and summer of 1988. The patrol vessel operating out of Grand Manan Island is now double crewed for both enforcement and search and rescue service seven days a week.

Equipment available to Fishery Officers has improved. A dye test now allows officers to detect scrubbed lobsters. Upgraded communication systems result in more efficiency and safety in the deployment of field staff. A computerized licensing system allows Fishery Officers instant access to records to verify the ownership of vessels and licences. Officer training is improving; new recruits are now given a two year program of training in habitat, law, human relations, enforcement techniques, firearms, enforcement administration, prosecution, etc. DFO is relying heavily on more highly qualified, better trained staff supported by modern technology. Effective enforcement will in future be at least as dependent on industry cooperation as in the past.

These and similar approaches are being taken in all fisheries management programs in the Scotia-Fundy Region and throughout all programs in DFO.

8 CONSULTATION WITH INDUSTRY

8.1 Introduction

This chapter explains how the industry is being consulted and how it will participate in the Socio-Economic Review of the Scotia-Fundy Region's lobster fishery. It records the views and comments of industry spokespersons and individual fishermen and identifies the issues which need to be pursued.

8.2 The Consultation Process

On June 3, 1988 a letter from J.-E. Haché, Director General, Scotia-Fundy Region, informed all licence holders of the study. A steering committee was established chaired by J.-E. Haché with representatives of DFO Halifax and Ottawa. Working groups were set up to cover particular areas of the study.

Gilles Thériault, president of GTA Fisheries Consultants, joined the steering committee and was charged specifically with insuring that the industry was fully consulted. The steering committee directed that special meetings be conducted with the Lobster Advisory Committee in each fishing LFA. Gilles Thériault participated in these meetings. The purpose was to explain the process of the study, to put forward the report outline, and to receive industry comments. Other issues were discussed in these meetings, the most pressing being the question of whether to increase carapace sizes in response to a change in U.S. policy. The summary which follows, however, deals only with points made regarding the lobster study. The schedule of meetings with Lobster Advisory Committees appears in Exhibit 8.1.

SCHEDULE OF MEETINGS WITH LOBSTER ADVISORY COMMITTEES

Date	Where	With Whom
June 10	Yarmouth, NS	LFA 34 advisory committee
June 21	Halifax, NS	Scotia-Fundy Lobster Advisory Committee
June 30	Bridgewater, NS	LFA 33 advisory committee
July 6	Sherbrooke, NS	LFAs 31 & 32 advisory committees
July 11	Sydney, NS	LFAs 27, 28, & 29 advisory committees
July 21	Pennfield, NB	LFAs 36 & 38 advisory committee
July 22	Truro, NS	LFA 35 advisory committee
September 8	Halifax, NS	Scotia-Fundy Lobster Advisory Committee
September 21	Yarmouth, NS	LFA 34 advisory committee

Exhibit 8.1

Individuals and groups who did not have representation on Lobster Advisory Committees, but who had an interest in the lobster fishery, were also contacted.

Gardner Pinfold Consultants surveyed all lobster licence holders in Scotia-Fundy with a mailed questionnaire; just under 1,100 fishermen returned the questionnaire. The questionnaire had a final item which read:

> "Please use the space below to comment on the management of the lobster fishery."

Gilles Thériault analyzed fishermens' comments on this item; the analysis is included in this chapter.

Through the consultation process it was determined that the preliminary report would not contain recommendations, but would analyze conditions in the industry and identify issues to be addressed. After the first round of meetings with the Lobster Advisory Committees and other interested fishermen or groups, a draft report (i.e., this document) would be produced for review by the industry before a final report on conditions in the fishery was concluded.

A second phase of the study will involve further industry consultations and the development of recommendations on the key issues identified in this report.

8.3 Concerns and Issues Identified by Fishermen

The consultation process provided an open opportunity for the identification of issues and concerns of fishermen. A total of 731 fishermen who returned the Gardiner Pinfold questionnaire; 731 made comments, many of them detailed.

Through analysis of these comments, 172 specific statements were identified which could be sub-divided into 13 broad groups:

1. Statements of general satisfaction or dissatisfaction with the managment system.
2. Comments on the management process
3. Comments on surveillance, enforcement
4. Comments on regulating effort
6. Comments on the trap limit
5. Comments on carapace size issue
7. Comments on trap design and fishing method
8. Comments on the licensing system
9. Comments regarding "B" licences
10. Comments on fishermens' incomes, equity issues and newcomers
11. Comments on offshore lobster fishing
12. Comments on seasons
13. Miscellaneous comments

A short version of each statement is presented according to these 13 groups in the Addendum, Table 8.A, together with a count of the number of fishermen in each area who commented on the question. Each statement or item is numbered in the table, and the statements will be referred to below by these numbers.

Table 8.B identifies the proportion of fishermen who made each statement out of the total number of fishermen in each LFA who returned the questionnaire.

Fishermen made general statements about the management of the lobster fishery on 165 of the questionnaires. These were recorded on a five point scale: 1) highly satisfied; 2) somewhat satisfied; 3) 50/50 or mixed feelings; 4) somewhat dissatisfied; and, 5) highly dissatisfied. "N" refers to the number of fishermen in each LFA who made such general evaluative comments. The average score for each Lobster Fishing Area (LFA) are presented below (Exhibit 8.2). The lower the average score, the more fishermen approve of the management system for lobster. The higher the average score, the greater the dissatisfaction.

GENERAL EVALUATION OF LOBSTER MANAGEMENT SYSTEM

LFA	N	AVERAGE
27	25	1.8
28,29,30	9	2.4
31	7	1.6
32	5	3.0
33	43	2.9
34	60	3.1
35	2	2.0
36	5	2.4
38	9	2.4
Overall	165	2.7

Exhibit 8.2

Respondents in LFA's 27 and 31 expressed relatively high levels of satisfaction with the lobster management system, while those in 28, 29, 30, 35, 36 and 38 were moderately approving. Fishermen in LFA's 32, 33 and 34 were the most negative. The average score of 2.7 for the total group of fishermen who made general comments indicates fishermen have mixed feelings about the system.

8.3.1 Scotia-Fundy Lobster Advisory Committee

Fishermen argued that the analysis in the socio-economic study had to be carried out on an Area by Area basis. They asked whether buyers would be studied as closely as fishermen. They also said that the study should not be constrained by a tight time schedule.

With regard to research on the relationships between inshore and offshore lobster, fishermen on the committee stated that they want a tagging study to go ahead even if the proposed offshore licences have been suspended.

Representatives of the Maritime Fishermen's Union argued for more consideration of social aspects of community life with regard to the lobster fishery. However there was no agreement among the fishermen on the committee on the MFU proposal.

Other issues raised were the trap limit, licensing and the distinction between fishermen that have full-time jobs elsewhere and those that work in the woods, on the farm, and in certain other jobs. Fishermen who also work in other primary production industries can have category A licences, while those employed in other occupations cannot.

At the second meeting of the Scotia-Fundy committee in September, concerns were raised about the validity of the Gardiner Pinfold questionnaire. Some members believed that it achieved a low rate of return compared to other surveys. There was a view that the study was going to be used to justify new licences regardless of the real opinions of fishermen.

8.4 Analysis of Fishermen's Comments in each Lobster Fishing Area

Reports on meetings with lobster advisory committees are combined below with an analysis of questionnaire responses to provide a picture of the concerns of fishermen in each LFA. Comments which were made by 10% or more of the fishermen who answered the questionnaire are identified in the text.

8.4.1 LFA's 27, 28, 29 and 30

Any changes in the lobster fishery should be discussed with lobster fishermen before any definite decisions are made. The issuing of additional offshore lobster licences at this time will be disastrous to the lobster fishery. Stocks will be depleted, fishermen will be out of work . . .

- Fisherman, LFA 27

There is absolutely no control on trap limits or legal minimum lobster size. The Department of Fisheries doesn't even have a patrol boat. It's like the RCMP trying to control speed limits without cars.

- Fisherman, LFA 27

By controlling the licences, lobster fishing has gotten better. Otherwise it would be doomed. Lobster fishery is well managed. A person can make a living at it now.

- Fisherman, LFA 28/29

Questions raised about the validity of the questionnaire related to the perception that some fishermen who are new entrants may provide a lot of false information while others would throw the questionnaire out.

An important issue in some areas is the mobility of licences within the LFA. Fishermen operating on less productive grounds tend to move to the most productive ground within the lobster fishing area, resulting in over crowding. This most often happens when licences are transferred. Fishermen work to build up their local grounds, and then other fishermen can ruin it with overfishing.

Enforcement is a key issue for lobster fishermen. They feel there is a serious need for night and weekend surveillance to catch poachers. Fishermen say they have offered to show Fishery Officers where there was illegal fishing but the offer was not taken up. They also question the effectiveness of current penalties Fishermen caught scrubbing lobsters should be suspended, some say forever. In the Isle Madame area fishermen say there is a big problem with skin divers.

Fishermen expressed concern about the growing concentration of ownership among buyers. Clearwater Fine Foods is accused of pushing the prices down by 50 cents in 1988 over 1987 in one particular area. There was criticism of government subsidies going to Clearwater, and claims that these subsidies are hurting prices. Some fishermen asked; "Does Clearwater have a monopoly on the lobster fishery?"

The advisory committee system was questioned by some fishermen who complained that they are not properly represented in the consultation process.

The only items supported by 10% or more of the respondents of the questionnaire in LFA 27 were:

LFA 27 N = 88

Item	Comment	Occurrence
18	trap limits not adequately enforced	17.0%
23	not enough Fisheries Officers, or they aren't around enough	10.2%
34	there is too much effort, too many licences in my area	17.0%
49	increase minimum carapace size	10.2%

Compared to most other LFA's, there was greater concern in 27 about damage done to the lobster grounds by groundfish draggers, and relatively strong interest in lengthening the lobster season (items 129 and 169).

The only items supported by 10% or more of the respondents of the questionnaire in LFA's 28, 29 and 30 were:

LFA's 28, 29, & 30 N = 34

Item	Comment	Occurrence
19	size limits not adequately enforced, too many smalls landed	14.7%
30	fisheries officers don't work hard enough, not diligent	11.8%
34	there is too much effort, too many licences in my area	11.8%
101	increase trap limit for "B" licence holders	11.8%

8.4.2. LFA 31 and 32

I believe the fishery is being managed well and also believe that the issuance of any more licences, inshore or offshore, would have a negative effect on the lobster stocks and on the people holding a licence now.

- Fisherman, LFA 31

Cost of management is excessive for accomplishments, especially when decisions are made for the good of the politician rather than the fisherman.

- Fisherman, LFA 32

I have fished lobsters for 40 years and have seen the low and the high catches come and go. I do not want to see any new licences in the fishery. I would like to see the size go with the U.S. measure. I would like to see the escape vents become law. We need more enforcement to keep fishermen from breaking the laws, bringing home small lobster and setting more traps than allowed.

- Fisherman, LFA 32

At the Lobster Advisory Committee meeting DFO's credibility was discussed. Members of the committee stated that the negative impacts of decisions like the issuing of offshore licences need to be assessed very carefully. Concerns were also expressed that fishermen would not answer the Gardner Pinfold questionnaire because of the lack of credibility of DFO. There was a consensus that improvements in credibility and in relations between fishermen and the Department in general depend on the consultation process.

There was also agreement among the fishermen's representatives on the need to study penalties, and to push for more severity. Fishermen wanted to know if stiffer penalties had had any positive impact in the scallop industry.

Regarding the Lobster Advisory Committee, fishermen-members were believed to have too big an area to represent. The total number of fishermen in the LFA may not be high, but the territory is hard to cover.

The relationship between opening and closing dates and lobster prices was also singled out as an issue which needs to be studied. When there is an overlap, the opening of a season in one area can hurt prices in another one which is just closing. There is also a need to study the impact of the canner fishery on enforcement and on prices. If one area fishes canners and another does not, enforcement against undersized lobsters is made more difficult. There is a need for more uniformity of management policies in neighboring LFAs.

The only items supported by 10% or more of the respondents of the questionnaire in LFA 31 were:

LFA 31 N = 35

Item	Comment	Occurrence
1	no major changes needed, leave it alone	14.3%
35	no new licences should be issued	22.9%

Given also the comparatively strong showing of item 126 ("no new offshore licences should be issued"), it would seem that there is strong opposition in this area to any dramatic changes in the operation of the lobster fishery. There was also stronger support for item 45 ("catches are now better due to good management") than in most other areas.

The only item supported by 10% or more of the respondents of the questionnaire in LFA 32 was:

LFA 32 N = 44

Item	Comment	Occurrence
24	penalties not effective, not severe enough	18.2%

There were expressions of concern about landing of small lobster in LFA 32, about fisheries officers not being around enough, and about the general need for more surveillance and stricter enforcement. The relatively high scores on items 56, 62 and 63 suggest some interest in the area in reducing the trap limit. The comparatively strong support for items 108 ("B licences should be excluded..") and 118 ("too many people fishing lobster who have other full-time jobs") indicates that the continued activity of part-time fishermen is an issue in the area.

8.4.3 LFA 33

I think the government should stop wasting its money on studies like these and put more money into "hands on" management of the fishery. Scotia-Fundy Region has a $150 million budget and employs only 12 fisheries officers to monitor adherence to regulations. That's ridiculous. If DFO can't monitor the licences already out there, how can they think of issuing more.

- Fisherman, LFA 33

Lobster fishery management is very good but the government should keep their nose out of it and let the fishery board of the local area look after it. They, the government, are always throwing a monkey wrench into the rules and regulations and changing them too many times and you can't keep up with them.

- Fisherman, LFA 33

Fishermen's representatives on the Advisory Committee said that they wanted to see a tagging program in the area where the proposed new offshore licences would be issued. The research effort could be funded with the $200,000 that was going to be used for the proposed observer program for offshore boats. The current tagging research is not believed to be getting the support from fishermen that is needed, especially in southwest Nova Scotia. One fisherman said that if there was going to be an offshore fishery, why not let the inshore fishermen participate.

Another fisherman proposed that the study should look at the problem of fishermen who sell their category A licences, make money off the sale, and then want new licences. It was suggested that many of the fishermen who want new "A" licences fall into this category. There is confusion on licensing policy, and most fishermen are not aware that they do not own their licences and cannot sell them to whoever they want. It was said that this situation is made worse because "A" licences can be sold at considerable profit through special request to DFO, while "B" licences must revert to the department. It was felt that there should be a clear, consistent rule on this.

A major concern of the fishermen in this area was said to be the overfishing of the trap limit. The system of fishermen policing themselves is not working. There was a strong view that "you have to nail a guy to the cross" with much more severe penalties. There is a particular problem with fishermen who switch to steel or wire traps, but keep their wooden traps and use them illegally. The fishermen wanted to know why their proposals on increasing the severity of penalties have not been acted on.

Some fishermen felt that they were being pressed too quickly on the preparation of the report of the lobster study. Representatives stated that "this is an important fishery and we do not want a rush job. The lobster fishery is the king, it is the backbone of the fishing industry, and we can't take any chances playing around with snap decisions.

The only items supported by 10% or more of the respondents to the questionnaire in LFA 33 were:

LFA 33 N = 233

Item	Comment	Occurrence
18	trap limits not adequately enforced	16.7%
35	no new licences should be issued	11.6%
59	many or most fishermen overfish trap limit	11.6%

Poaching, the apparent shortage of fishery officers, and inadequacy of surveillance and enforcement were frequently mentioned in questionnaire comments as problems. Along with the view that no new licences should be issued, there was frequent mention that there was too much effort on lobster in the area (item 34).

8.4.4 LFA 34

I would like to see that all gear, buoys, ballons and traps have to have the boat or owner's name on them and anyone fishing unmarked or untagged gear forfeits his licence and the licence is then put up for a draw for those who want a licence - with no exceptions, which I believe would help solve the problem of fishing excessive gear and also help new entrants to the fishery.

- Fisherman, LFA 34

Conservation has been brought about by not issuing more inshore licences, a gross sin for our younger generation who are denied the right to fish which so many of them desire. The licence holders seem to get richer and the poor poorer. The wealth of our fish seems to be divided.

- Fisherman, LFA 34

There also should be a degradable device for wire-wood traps and wire traps to prevent ghost fishing. This device would help the lobster fishery because there is a high number of traps lost each season which traps a lot of lobster needlessly.

- Fisherman, LFA 34

... the way its being managed now, you can set 2,000 traps, winter and spring, and nobody, no fisheries inspector, bothers you.

- Fisherman, LFA 34

At the first meeting of the advisory committee, representatives made the point that DFO studies are always economic, although they are often called socio-economic. The social aspects of the fishery are not adequately considered.

They said they wanted fishermen on the steering committee, wanted to have public meetings and wanted letters to be going out to fishermen regularly. They emphasized the question: is the granting of new offshore licences really the hidden agenda of the study? Fishermen wanted representatives of each individual area to be consulted separately for the study. The time frame was a matter of some concern. Fishermen did not want to see a rush job on such an important issue. They objected to having to discuss the terms of reference for the study in the same meeting as the carapace size issue.

At a second meeting of the LFA 34 advisory committee, concern was expressed about whether there would be enough opportunity for fishermen to express their views to the study team. The report was due in October, but there had not been enough contact with fishermen and with those who wanted new inshore licences.

A 35% return rate on the Gardiner Pinfold questionnaire was not considered good enough. Other studies on lobster and groundfish had had much higher rates of return. It was possible that fishermen who were the most unhappy with the management system were the ones who did not return the questionnaire, and so the sample would be biased. Many fishermen had expressed the view to committee members that their comments would be used against them in the granting of new offshore licences. It was believed that some questions on the questionnaire were not answered truthfully, e.g., the number of traps fished.

The MFU proposed that there be enough time between the preliminary report and the final version for fishermen to study it and provide input. The MFU is arranging a one day seminar to bring non-DFO experts in biology, marketing, sociology, economics, etc., together to review the report and to discuss it with the fishermen.

The only items supported by 10% or more of the respondents to the questionnaire in LFA 34 were:

LFA 34 **N = 231**

Item	Comment	Occurrence
18	trap limits not adquately enforced	35.1%
35	no new licences should be issued	16.5%
59	many/most fishermen overfish trap limit	15.2%

8.4.5LFA 35

Enforcement is the biggest problem in the fishery today. There is not enough of it. Also, the slowness of the DFO to change regulations and policies, such as a two-day setting time, escape hatches, etc. They do not pay enough attention to what the fisherman say.

- Fisherman, LFA 35

Participants at the Advisory Committee meeting raised the issue of part-time fishermen. Some fishermen said that people should not be able to have full-time jobs and fish lobster, even if they only have "B" licences.

The biggest difficulty faced by fishermen in the upper bay of Fundy is the tides. Some ports do not even have a low water wharf. Under these conditions, fishermen cannot apply the same fishing effort as others within the season. They want to review opening and closing dates, and want to see the upper Fundy area considered a separate area.

Safety is also an issue. Lobster boats are being overloaded, and that is a major problem in some areas. Fishermen want to have a limit on the number of traps that can be put in a boat. They also suggest that the study look at the impacts of the government Fishing Vessel Insurance Program and the Provincial Loan Board.

Questionnaire figures for this LFA may be overstated because there were such a small number of respondents. As a result, while the percentages are quite high, only items 38 and 49 were mentioned by more than one fisherman.

LFA 35 N = 13

Item	Comment	Occurrence
38	ban Sunday fishing	15.4%
51	leave carapace sizes as they are (keep canners)	15.4%

8.4.6 LFAs 36 and 38

Lobster fishing, years ago, was a sideline here for most fishrmen. . . Since the Department has started taking licences when they are not being used, more people fish more instead of less - scared of losing their licence, "forced to fish", we call it. This may be a good regulation in some places but it is a poor one here.

- Fisherman, LFA 36

Get rid of the double licences and make everyone equal. Cut down on the number of traps per boat. Give everyone 300 to 325 per boat or, in my opinion, our lobster will be gone and then no one will be fishing. There is very little bottom and too many traps.

- Fisherman, LFA 38

Poaching was identified as a major problem by advisory committee members from LFA 36. Smaller lobsters that are poached are sold in Saint John as canners from the Gulf. Fishermen said that there should be some sort of chemical test to tell a Bay of Fundy lobster from one from the Gulf. There needs to be more enforcement to catch buyers who buy lobster out of season and put them in pounds. This is not just with reference to individual poachers - there is an organization, and they are not only fishing inshore now, but are going outside too. Poachers are also believed to be stealing traps from fishermen.

With regard to the lobster study, it was felt that DFO had a credibility problem. Representatives said that they suspected that DFO would just pick the things they wanted to hear out of the study and ignore anything else. Fishermen are very concerned that they are not listened to. They also say that the study should look at whether the increase in prices to fishermen has kept up with other prices over the years.

Some fishermen commented that biologists should be spending a lot more time with fishermen, and should be involving fishermen more in their research. Fishermen want the biologists to keep testing the bottom near aquaculture projects to see if there are negative effects on lobster. Concerning aquaculture rules, they say there has to be a meeting where fishermen can raise objections before a new operation can be started. Such a requirement exists in Nova Scotia, but in New Brunswick new operations just appear without notice.

Some felt that the restricted licence has not helped the fishery, and that the more regulations you have the more laws are broken. Those who support this view believe that there should be no regulations, and open fishing for everyone. The main view was that DFO is letting more fishermen in under the restrictive fishery than otherwise would be the case. Category "B" licences are also an issue.

The only items supported by 10% or more of the respondents of the questionnaire in LFA 36 were:

LFA 36 **N = 33**

Item	**Comment**	**Occurrence**
19	size limits not adequately enforced, too many smalls landed	12.1%
20	need more protection *vs* poaching	27.3%
146	open season 2 weeks earlier	15.2%

There was also some support in LFA 36 for the view that fishery officers were not around enough. There was proportionally more agreement in this area than in any other on the need for escape hatches in traps (item 72), and similarly more disapproval of the licensing system (item 89). Opposition to the offshore lobster fishery was also evident.

Representatives from LFA 38 did not attend the meeting with the study team. The items supported by 10% or more of the respondents of the questionnaire in LFA 38 were:

LFA 38 **N = 20**

Item	**Comment**	**Occurrence**
18	trap limits not adequately enforced	40.0%
19	size limits not adequately enforced, too many smalls landed	10.0%
31	in general, more surveillance and stricter enforcement needed	10.0%
34	there is too much effort, too many licences in my area	10.0%
56	trap limit should be reduced	10.0%
59	many/most fishermen overfish trap limit	10.0%
66	should be 300	15.0%
95	opposed to double licences - (partnerships)	10.0%

8.5 Meetings with Lobster Licence Applicants and Others

Interest groups not represented on the lobster advisory committees were also given a chance to be heard if they so wished. Of particular importance were inshore fishermen who wanted to have access to lobster licences. Gilles Thériault had a special meeting with Mr. Tony Cunningham and Mr. Gary Nickerson in order to hear this point of view.

Many issues were raised which related to making more room for new licences. The main point made was the amount of overfishing of the trap limit that was going on. They claimed that if this problem was controlled, the number of licences could be increased by one or two hundred without any overall increase in the present levels of effort.

They believed that penalties were not severe enough, that DFO fishery officers should have more authority to impound traps, that most judges do not understand or know enough about the fishery, and that there should be a special crown prosecutor assigned to fisheries matters. They felt the prevailing attitude in DFO is that fishing too many traps is not a serious problem, and that this is wrong.

They objected to the cost associated with buying a licence, claiming that traps and licence alone can be sold for as high as $50,000, with some going up for as much as $100,000. They believed that the whole issue of a fishing permit being a privilege and not a right is not being respected. They said the permits should stay in the community and not move around according to the price. They believed that, when a licence becomes available, criteria should be set to qualify and that there should be a draw for the licence. Commercial fishermen with a boat and no licence should be given priority when a licence becomes available.

They also believed that non-licensed individuals should be given a seat on the advisory committees in order to assure that points of view other than those of licensed fishermen get a chance to be put on the table.

Mr. Thériault also met with Mr. Gerald Comeau, Member of Parliament for Southwest Nova Scotia, who has shown great interest in the study and wanted to be given an update in early October.

The study was discussed with many other individuals on a more informal basis. For example, many participants at the Fisheries Council of Canada's annual meeting asked about the study and gave their views. One individual believed that the offshore quota would probably not be caught this year and studies should be done as to why. Suggestions were also made that the impact of draggers on lobsters on Brown's Bank should be looked into.

8.6 Identification of Issues

The consultation process and questionnaire allow the key issues of concern to the industry to be identified. These issues are discussed below.

8.6.1 Areas of substantial agreement or consensus

The Socio-economic Study of the Lobster Industry:

- DFO has serious credibility problems among fishermen, many of whom do do not trust the study and will not participate;
- Many fishermen feel that the study is a smokescreen to justify granting new licences to inshore and/or the offshore fishermen;
- A high level of consultation has to be conducted with the industry, carried out on an area by area basis;
- The subject matter of the study is crucially important, and therefore the study should not be rushed through;

The management system and the consultation process:

- The balance of influence and decision making is weighted too heavily to the side of administrators, bureaucrats and politicians;
- Fishermen should have more say and involvement;

Surveillance and enforcement:

- The trap limit is not adequately enforced;
- There is inadequate enforcement with regard to poaching, landing of undersized lobsters, and landing of berried females;
- There are not enough fisheries officers in each area to enforce the laws effectively;
- Penalities are not severe enough;

Regulating effort:

- Many if not most areas are currently fished to their limits or overfished;
- New systems or methods are needed to control overall effort on the stocks;

Carapace size:

- Fishermen supported some increase in minimum carapace size or the doing away with the canner sized lobster by a ratio of about 3 to 1;

Trap limit:

- There was strong agreement that the trap limit is over-fished by many or most fishermen;

New licences:

- There is virtually unanimous opposition to issuing new offshore licences;
- The majority of fishermen are opposed to issuing new inshore licences;

Trap design:

- Concerns about "ghost fishing" and high fatality rates for small lobsters in traps were raised. While some fishermen opposed mandatory escape hatches, a clear majority of those who commented on this issue were in favour.

8.6.2 Areas of disagreement or lack of consensus

The Socio-economic Review of the Lobster Industry:

- A special effort to include analysis of the social basis of the fishery is required because it is usually not given adequate consideration;
- A number of questionnaire respondents expressed very negative views about the usefulness of questionnaires, and doubted that fishermen's views were ever really taken into account;

Trap limit:

- There was disagreement as to what to do about fishing too many traps. Most favoured stronger enforcement, some favoured reducing the trap limit, and a few proposed doing away with it;

Access to licences:

- While the majority of fishermen were opposed to new licences, a minority expressed concern about access for younger fishermen, and felt that new licences could be granted if enforcement was tightened up. Some wanted a system which would redistribute existing licences at affordable prices when licence holders leave the fishery. Several mentioned that wealth was becoming concentrated in the hands of too few fishermen, and that there should be ways to ensure a fairer distribution of the benefits of the industry;
- Opinions were divided about whether licences should be sold on the "free market", whether partnerships under which two licences are fished from one boat should be allowed, and whether companies should be allowed to own licences or hold multiple licences;

"B" Licences:

- There was controversy on issues concerning "B" licences. Category "B" licence holders expressed dissatisfaction with the way they have been treated, in particular being prevented from upgrading to an "A" licence when their employment situation changes. "A" licence holders expressed dissatisfaction about people with other occupations having lobster licences at all;

Seasons:

- There were a number of specific proposals for changes to closing and opening dates and to the length of seasons. This issue deserves greater attention in the follow-up meetings at the area level to see if there is some consensus regarding specific changes.

9 CURRENT ISSUES FACING THE INDUSTRY

The main purpose of Phase I of the study was to develop a "snapshot" of the lobster fishery in the Region and to reach consensus on the current issues facing the industry. Working toward agreement on how these issues would be dealt with will come in Phase II.

The process of identifying major current issues involved extensive input from industry and individual fishermen. DFO staff analyzed the biological and socio-economic factors influencing the fishery, and produced a draft list of issues and a framework within which those issues could be considered.

That material was consolidated into a Working Committee Draft Report for the consideration of Lobster Fishing Area Committees and other interested parties. Further consultations, in March and April 1989, identified changes to the original proposed list of issues and considerations and suggested more emphasis be placed on the management process issues.

This report is intended to sum up Phase I by presenting an agreed upon framework and list of issues and considerations to serve as a basis for Phase II. A three-part framework which grouped similar issues was developed to assist further consultation. It consisted of:

> (1) **Management Process Issues** - those generally involved with the mechanisms of managing the fishery;
>
> (2) **Conservation - Economic Issues** - those involved in realizing the largest benefit from the fishery at the least cost; and
>
> (3) **Socio-Economic Issues** - those generally concerned with how the net benefits generated as a consequence of (1) and (2) are to be distributed.

Management Process Issues:

As described in Chapter 7, DFO's fishery management programs use about 1/3 of the budget of the Scotia-Fundy Region; or about $35 - $40 million per year. Biological, environmental and economic research and advice costs about $16 million (41% of fisheries management costs); consultation, allocation and regulation about $6 million (15%); and surveillance and enforcement about $17 million (44%).

Lobster fishery management costs about $8.5 million or about 22% of the funds spent on regional fisheries management programs. Since the value of lobster landings varies between 20% and 28% of the landed value from all fisheries in the Region, lobster management appears to receive a fair share of available regional funding.

General cutbacks in government spending and inflation have reduced DFO budgets and purchasing power in the last few years. Improvements in departmental efficiency go to offset these reductions. New initiatives can only be funded by withdrawing support from low priority programs or recovering costs.

Compliance and enforcement of regulations were foremost in the minds of fishermen. They felt the most significant issues associated with the Management Process were:

Issue 1: Failure to comply with the trap limit.

- Overtrapping is regarded as the most widespread violation in the Region. Fishermen lose an estimated $1.7 million in profits for each 10% of traps fished in excess of the current 900,000 legal trap limit.
- Improvements to the tag system and application of the requirement for marking surface buoys were suggested for consideration in improving enforcement.
- In some areas peer pressure by fishermen was reported to have reduced or eliminated overtrapping.

Issue 2: Failure to comply with the legal minimum carapace size regulation.

- Retention of "short" lobsters by licenced fishermen and by poachers is a concern, especially near urban areas and along the Eastern Shore of Nova Scotia.

- Escape vents and minimum lath spacing are expected to help somewhat.
- The existence of a smaller legal minimum carapace size limit in some Atlantic areas is considered a complicating factor.

Issue 3: Poaching, fishing out of season or without a licence.

- These violations are committed by licenced or unlicenced fishermen and require cooperative action by industry and DFO officers.

Issue 4: Retention and scrubbing of berried female lobster.

- The detection of scrubbed female lobster has improved significantly through the use of a chemical test which has been upheld in court cases.

Some common features for a sound compliance and enforcement program to deal with all four issues were:

- The regulations must be beneficial and be seen to be beneficial by fishermen, enforcement officers and the courts.
- Regulations must be enforceable.
- Penalties for violations must be severe enough to serve as a deterrent.

The suggestions most commonly advanced by fishermen to deal with these issues and considerations included:

- "Fishermen's Watch" programs to assist and supplement DFO surveillance and enforcement efforts.
- Support from fishermen, Associations, etc. for more punitive penalties such as licence suspensions during peak fishing times for fishermen and severe fines for non-fishermen.

Fishermen raised a number of other issues which related to improvements in the management process:

Issue 5: Is there an appropriate blend of responsibility and authority among fishermen, politicians and bureaucrats in the development and implementation of the management regime?

Issue 6: Can regulatory change be made more efficient and timely? Can flexibility be introduced, perhaps outside the regulatory framework, which would permit more effective responses to changing circumstances and local requirements?

Issue 7: Is the formal judicial system the most effective way to administer fishery regulations? Would a quasi-judicial system which applied the required principles of natural justice be less costly and more effective than the use of the existing criminal court system?

- These issues contain fundamental questions on the management process and have implications for other fisheries.
- Fishermen expressed frustration with cases where enforcement was effective and violators were found guilty but the court system applied penalties so low as to negate any deterence.

A number of issues related to the research necessary to support the management process were raised:

Issue 8: How can the biological research program be made more effective through industry support?

Issue 9: How can the socio-economic research program be made more effective through industry support?

Issue 10: What market research is required to understand the supply, demand and price relationships that are important to management decisions?

- Approximately 32% of lobster management costs are for research. Fishermen can support research efforts particularly by providing data on their activities which can be used directly in understanding lobster biology and ecology, and industry performance.

Conservation - Economic Issues

The issues concerned with maximizing the value of the fishery while minimizing the costs of fishing, have been agreed to be:

Issue 11: How can the planned 2/16 inch increase in the minimum carapace size regulation being phased in by 1992 be used to help determine the best carapace size regulations for the fishery in the future?

- A 1/16 inch increase is going forward in the fall of 1989 with a subsequent 1/16 inch increase coming into effect by 1992. A small increase in landings over what would otherwise be is expected after an initial adjustment period.
- The increase provides an opportunity to study market response and to conduct research related to market willingness to pay more per pound for larger market grade lobsters.
- The phase-in plan can enable different time frames for the implementation of carapace size changes to be evaluated.
- Research indicates that fishermen would receive higher economic returns from further increases in carapace size. The optimum size could vary among LFA's.

Issue 12: Are trap limits set at the best levels in all Lobster Fishing Areas?

- If improved compliance with trap limits can be achieved, fishermen in some LFA's may increase their profits with lower trap limits.

Socio-Economic Issues

The issues concerned with the distribution of benefits from the fishery generated through parts I and II of the framework were agreed to be:

Issue 13: Should the policy on "B" licences be changed?

Issue 14: Should the policy on Partnership licences be changed?

- "B" licenceholders who have ceased to be employed outside of the fishery want to be upgraded to "A" status.
- Existing "A" status licenceholders want to cancel the licences of "B" licenceholders who have "jobs outside the fishery".
- Some fishermen feel it is unfair for two "A" licenceholders to form a partnership and be able to fish 1.5 times the trap limit from one vessel. There are, however, obvious benefits to all fishermen from having one vessel and half the trap limit of one fishermen out of the water. Any two "A" fishermen can choose this option.

Issue 15: Should new licences be issued?

- Incomes have been relatively good in the lobster fishery and many unlicenced fishermen want new licences.
- Additional licences would increase employment in the fishery by sharing the income among more fishermen.
- Additional licences would also add costs and reduce the overall net income earned from the fishery.
- Existing licenceholders believe the cycle of lobster abundance may turn down, bringing less prosperous times in which the industry could ill-afford to carry additional licencees.
- Lobster fishermen also believe that new licences are not required to catch the lobster available for harvest, and that exploitation rates are already excessively high.
- Fishermen can obtain a licence by arranging for the reissue of an existing licence.
- Inshore fishermen fear not enough is known about the interaction between inshore and offshore lobster to justify issuing new offshore licences or to increase offshore quotas.
- Biologists recommend more data be gathered on the offshore lobster fishery.

Phase II

Phase II of this process will aim at resolving the issues and pursuing opportunities arising out of Phase I. The Scotia-Fundy Regional Lobster Committee and the Lobster Fishing Area Committees constitute the formal structure for interaction between industry and DFO in the Region. This elected committee system will be used to consult with fishermen during Phase II. Committee meetings will be augmented by a series of workshops which will provide an opportunity for any lobster fishermen to participate directly in the process. The workshops will also be open to fishermen who do not hold lobster licences.

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Annex A

Scotia-Fundy Inshore Lobster Fishermen Survey

1. Lobster Fishing Area (LFA): 27 28+29 30 31 32 33 34 35 36 38

2. What year were you first licenced to fish lobster? 19

Please provide the following information for 1978 and 1987.
If you were not licenced to fish lobster until after 1978 provide information for the year you started and 1987.

	1978		1987	
3. What licences did you hold and use: (mark with an "X")	Hold	Use	Hold	Use
Lobster				
"A"	☐	☐	☐	☐
"B"	☐	☐	☐	☐
"Partnership"	☐	☐	☐	☐
Groundfish	☐	☐	☐	☐
Herring	☐	☐	☐	☐
Mackerel	☐	☐	☐	☐
other	☐	☐	☐	☐

4. Lobster vessel characteristics:	1978	1987
Year Built		
Length (feet)		
GRT (tonnes)		
Horsepower		

(mark the following with an "X")	1978	1987
Engine		
Diesel	☐	☐
Gas	☐	☐
Outboard	☐	☐
Hauler		
Mechanical	☐	☐
Hydraulic	☐	☐
None	☐	☐
Electronics		
Radar	☐	☐
Loran	☐	☐
Sounder	☐	☐
Radio	☐	☐
Plotter	☐	☐
Hull Material		
Glass	☐	☐
Wood	☐	☐
Glass/Wood	☐	☐
Other	☐	☐

Également disponible en français.

5. How many miles from shore did you set traps:

	1978 Number of miles	1987 Number of miles
Maximum		
Minimum		
Average		

6. On average how many hours did you spend each day in your boat fishing for lobster (include time spent steaming to and from grounds and time hauling traps):

1978 Number of hours	1987 Number of hours

7. Did the number of traps you set, change or remain the same over the season: (mark with an "X")

	1978	1987
Increase		
Decrease		
Remain the same		

	1978	1987
8. What was the maximum number of traps you set:		
9. What was the minimum number of traps you set:		

10. How many traps of each type did you set:

	1978	1987
Wood		
Wire		
Combination Wood and Wire		

11. How many traps on average did you haul per fishing day:		

12. Did you routinely make trips, fishing for lobster, lasting more than one day: (mark with an "X")

	1978	1987
Yes		
No		

13. If you used a trawl, how many trawls and traps per trawl:

	1978	1987
Number of trawls		
Number of traps/trawl		
Did not use trawls ("X")		

14. How many pounds of lobster did you land:

	1978	1987
	lbs	lbs

15. How many weeks did you fish:

	1978 Number of weeks	1987 Number of weeks
Lobster		
Groundfish		
Herring		
Mackerel		
Other		

16. How many crewmen/helpers did you employ when fishing for Lobster:

	1978	1987
Number of crewmen/helpers		

17. Please indicate the number of weeks worked by each crewman or helper on your lobster boat:

	1978 Number of weeks worked	1987 Number of weeks worked
Crewman or helper #1		
Crewman or helper #2		
Crewman or helper #3		
Crewman or helper #4		

18. How were crewmen/helpers paid: (mark with an "X" the method of payment to each crewman or helper)

	1978			1987		
	Wage	Share	Other	Wage	Share	Other
Crewman or helper #1						
Crewman or helper #2						
Crewman or helper #3						
Crewman or helper #4						

19. Approximately what percent of the value of your total fish landings were from lobster landings:

	1978	1987
	percent	percent

20. What percentage of bait did you:

	1978	1987
Catch	percent	percent
Purchase	percent	percent
(total should add to 100%)		

21. How many days did you hold your lobster before selling them:

	1978 Days	1987 Days
Average days held	☐	☐

22. Did you sell to the same buyer or company throughout the year:

	1978	1987
Yes	☐	☐
No	☐	☐
If you sold to more than one buyer or company, how many different buyers or companies did you sell to:	☐	☐

23. What was the total value of your fish landings (including all species) in:
(mark with an "X")

	1978	1987
$0-$9,999	☐	☐
$10,000-$24,999	☐	☐
$25,000-$49,999	☐	☐
$50,000-$74,999	☐	☐
$75,000-$99,999	☐	☐
More than $100,000	☐	☐

24. Please use the space below to comment on the management of the lobster fishery.

Annex B

As part of the Socio-Economic Review of the Scotia-Fundy Lobster Fishery, a questionnaire was distributed by Gardner Pinfold Consultants to all lobster licence holders in Scotia-Fundy Region. At the end of the questionnaire there was an open-ended item which read: "Please use the space below to comment on the management of the lobster fishery." 731 fishermen, who returned the questionnaire, did make comments, many of them of some length and detail.

Through analysis of the comments, some 172 specific statements were identified. These were then grouped into 13 general categories. An abbreviated version of the 172 statements is presented in Exhibit B.1, together with a count of the number of fishermen in each district who made it. The last columns on the right side of the table give the total number of times each statement was mentioned, and the percentage of the total number of respondents who made it.

The row marked "N" gives the total number of fishermen in each district who returned the questionnaire. Each statement or "item" is given a number in the column on the extreme left of the table.

Exhibit B.2 helps to identify which issues were most important in each district. The percent figure represents the proportion of fishermen who made each statement out of the total number of fishermen in each district who

Exhibit B.1

Exhibit B.1 **FREQUENCIES OF RESPONSES BY DISTRICT**

		LOBSTER DISTRICTS										
		27	28/29/30	31	32	33	34	35	36	38	Total	PER CENT
	N	88	34	35	44	233	231	13	33	20		
ITEM	1. GENERAL											
1	no major changes needed, leave it alone	2	0	5	0	4	12	0	0	0	23	3
	2. MANAGEMENT PROCESS											
2	not enough cooperation, DFO and fishermen, fishermen's groups	5	0	0	0	0	0	1	1	0	6	1
3	fishermen should have more say, more involvement	5	1	0	3	1	9	0	2	1	23	3
4	fishermen should run it themselves through elected bodies	1	0	0	0	0	1	0	0	0	2	0
5	administrators, bureaucrats should have less say	1	0	0	1	4	5	0	1	1	13	2
6	too many chiefs	0	0	0	0	1	0	0	0	0	1	0
7	object to decision for more offshore licenses (how it was made)	1	2	0	0	1	6	0	1	0	11	2
8	lobster advisory committee should run fishery	0	1	0	0	1	0	0	1	0	3	0
9	biologists should have more say/role	0	0	0	0	1	0	0	0	0	1	0
10	DFO field staff should have more say/role	0	0	0	0	1	0	0	0	0	1	0
11	too many changes in rules and regulations, can't keep up with them	2	0	0	0	3	2	0	1	0	8	1
12	DFO doesn't listen to fishermen's comments on surveys	0	0	0	0	0	5	0	1	0	6	1
13	DFO doesn't listen to lobster advisory committee(s)	0	1	0	0	2	0	0	0	0	3	0
14	over regulation, too much government involvement	1	0	0	1	1	5	0	0	0	8	1
15	decisions for our area influenced too much by fishermen from other areas	0	0	0	0	2	0	0	0	0	2	0
16	our area is unique, need regulations specific to our area	0	0	0	2	0	0	0	0	0	2	0
17	need more seminars to educate fishermen on management and protectio	0	0	0	1	0	0	0	0	0	1	0
	3. SURVEILLANCE AND ENFORCEMENT											
18	trap limits not adequately enforced	15	0	0	3	39	81	1	1	8	148	20
19	size limits not adequately enforced, too many smalls landed	5	2	0	4	15	10	0	4	2	42	6
20	need more protection vs poaching (out of season fishing, raiding traps)	6	5	1	2	21	18	0	9	1	63	9
21	restrictions on landing females (berried lobsters) not adequately enforce	1	2	0	2	3	4	0	2	0	14	2
22	not enough patrol boats	1	1	0	0	1	0	0	2	0	5	1
23	not enough fisheries officers, or they aren't around enough	9	2	0	4	23	11	0	3	0	52	7
24	penalties not effective, not severe enough	7	1	1	8	9	18	0	1	0	45	6
25	surveillance inadequate on weekends	0	1	0	0	3	0	0	0	0	4	1
26	all fishing gear should have fishermen's name or number	0	0	0	1	4	2	0	0	0	7	1
27	if regulations strictly enforced, more licences could be issued	0	0	0	0	3	2	0	0	0	5	1
28	many/most fishermen misreport landings	0	0	0	0	0	0	0	0	0	0	0
29	need a better tag which will stay on trap	0	0	0	0	1	6	0	0	0	7	1
30	fisheries officers don't work hard enough, not diligent	0	0	0	0	2	3	1	0	0	6	1
31	in general, more surveillance and stricter enforcement needed	2	4	0	4	17	6	1	0	2	36	5
32	violaters should lose licence, give to new fishermen through a draw	0	0	0	1	0	1	0	0	0	2	0
33	in late 70s, heavy fines and suspensions were effective deterrents	0	0	0	1	1	1	0	0	0	3	0

Table 8A

	FREQUENCIES OF RESPONSES BY DISTRICT	LOBSTER DISTRICTS										
		27	28/29/30	31	32	33	34	35	36	38	Total	PER CENT
	4. REGULATING EFFORT											
34	there is too much effort, too many licences in my area	15	1	0	3	20	7	1	1	2	50	7
35	no new licenses should be issued	7	4	8	2	27	38	1	1	0	88	12
36	no more traps should be allowed	2	0	0	0	1	0	1	0	0	4	1
37	no transfer of licences into area should be allowed	6	2	0	0	6	0	1	0	0	15	2
38	ban Sunday fishing	0	0	0	0	8	3	2	0	0	13	2
39	have to overfish to keep share of catch because others do it	0	0	0	0	1	8	0	0	0	9	1
40	expect landings to fall off in future due to overfishing	0	2	0	2	7	6	0	0	1	18	2
41	put a limit on maximum boat size	0	0	0	0	1	1	0	0	0	2	0
42	more effort is now needed to maintain catch levels	1	0	0	0	0	1	1	0	0	3	0
43	set a 10 to 12 mile buffer zone between inshore / offshore lobster fishing	0	0	0	0	0	1	0	0	0	1	0
44	should be a quota system, a catch limit per vessel or licence	0	0	0	0	1	4	0	0	1	6	1
45	catchs are now better due to good management	8	1	3	2	2	0	0	0	0	16	2
46	distribute more licenses to full time fishermen	0	0	0	0	1	2	0	0	0	3	0
47	need to reduce effort significantly to protect stocks	0	2	0	1	1	2	0	0	1	7	1
48	a buy-back programme should be instituted to reduce effort	0	0	0	0	1	0	0	0	0	1	0
	5. CARAPACE SIZE											
49	increase minimum carapace size	9	0	0	1	5	3	0	1	1	20	3
50	go to US carapace size limit	0	0	0	1	3	3	0	1	0	8	1
51	leave carapace sizes as they are (keep canners)	2	0	1	1	2	2	2	1	0	11	2
52	have a maximum carapace size limit (e.g. 5 ") to protect big lobster	0	0	0	0	4	3	0	0	0	7	1
53	ban fishing of "jumbos"	0	0	0	0	2	1	0	0	1	4	1
54	do away with canners	1	0	0	0	0	0	1	0	0	2	0
55	decrease minimum carapace size	0	0	1	0	0	0	0	0	0	1	0
	6. TRAP LIMIT											
56	trap limit should be reduced	1	1	0	2	9	4	0	1	2	20	3
57	strictly enforce trap limits or do away with them	0	0	0	1	2	16	0	1	0	20	5
58	there is no need for trap limit	0	0	0	0	1	4	0	0	0	5	1
59	many/most fishermen overfish trap limit	2	0	0	0	27	35	1	1	2	68	9
60	should be 400	0	0	0	0	1	3	0	0	0	4	1
61	keep it the same and strictly enforce	0	0	0	0	3	7	1	0	0	11	2
62	should be 200	1	3	0	4	4	0	0	0	0	12	2
63	should be 150	0	0	0	1	7	0	0	0	0	8	1
64	should be 175	0	0	0	0	0	0	0	0	0	0	0
65	it works - leave it as it is	0	0	0	0	1	4	0	0	0	5	1
66	should be 300	1	0	0	0	1	4	0	0	3	9	1
67	it's a failure, it's unworkable	0	0	0	0	3	4	0	0	0	7	1
68	600 traps in December, 600 traps Apr 15 - May 31.	0	0	0	0	0	1	0	0	0	1	0

Exhibit B.1

	FREQUENCIES OF RESPONSES BY DISTRICT	LOBSTER DISTRICTS										PER CENT
		27	28/29/30	31	32	33	34	35	36	38	Total	
69	it's the honest man who suffers from non-enforcement	0	0	0	0	4	7	0	0	0	11	2
70	should be 500	0	0	0	0	0	3	0	0	0	3	0
71	trap limit 250	1	0	0	0	0	0	0	0	0	1	0
	7. TRAP DESIGN AND FISHING METHODS											
72	escape hatches should be required	3	0	2	2	3	3	0	2	0	15	2
73	escape hatches don't work, against them	0	0	0	0	7	0	0	0	0	7	1
74	maximum size for fishing bows or rings should be 6"	0	0	0	1	2	0	0	0	0	3	0
75	ban or limit the use of traps on trawls	0	0	0	0	8	1	0	0	1	10	1
76	limit number of traps per trawl (e.g., 15)	0	0	0	0	1	0	0	0	0	1	0
77	strictly control lathe spacing	0	0	0	0	2	0	0	0	0	2	0
78	need escape method for lost wire or steel traps to prevent ghost fishing	0	0	0	0	1	2	1	1	0	5	1
79	limit trap moorings max 5 fathoms - long moorings a safety hazard	0	0	0	0	1	0	0	0	0	1	0
80	something must be done to prevent lost traps from continuing to fish	0	0	0	0	0	2	0	0	0	2	0
81	should have two days to set traps, not one, for safety reasons	0	0	0	0	0	1	0	0	0	1	0
82	entrance rings should be max. 5"	0	0	0	0	0	1	0	0	0	1	0
83	disapprove of wire traps	0	0	0	0	1	0	0	0	0	1	0
	8. LICENCES											
84	more flexibility needed	0	0	0	1	1	0	0	0	0	2	0
85	quicker processing of applications, appeals, etc.	0	0	0	0	0	0	0	0	0	0	0
86	allow only full-time, professional fishermen to have A licences	0	1	0	2	3	1	0	0	0	7	1
87	should be open access to licences (like U.S.)	0	0	0	0	0	3	1	1	0	5	1
88	allow only full-time fishermen to fish lobster	0	0	0	0	2	1	0	1	1	5	1
89	disapprove of licensing system in general	1	0	0	0	2	3	0	2	0	8	1
90	no selling of licences - they should revert to DFO	0	0	1	1	3	1	0	0	0	6	1
91	companies or individuals shouldn't have licences, pay others to fish them	0	0	0	0	6	0	0	0	0	6	1
92	a fisherman who sold a licence should not be able to get it back	0	1	0	0	1	0	0	0	0	2	0
93	should be able to transfer licence boat to boat as before	0	0	0	0	3	0	0	0	0	3	0
94	should not be able to sell licences from one area into another	1	0	0	1	1	0	0	0	0	3	0
95	opposed to double licences - 2 licences per boat	0	0	0	0	1	3	0	0	2	6	1
96	licences should be available to give young fishermen access to industry	0	0	0	0	3	3	0	0	0	6	1
97	support double licences - 2 licences per boat	0	0	0	0	0	1	0	0	0	1	0
98	no-one should be allowed to hold more than 1 licence	0	0	0	0	1	0	0	0	0	1	0
99	should be able to sell lobster licences to highest bidder	0	0	0	0	2	0	0	0	0	2	0
100	regulation against A licence holders having other jobs is unjust	0	0	1	0	0	0	0	0	0	1	0
	9. B LICENCES											
101	increase trap limit for B licence holders	1	0	0	1	3	0	0	0	1	6	1
102	B licence holders should get A licences back when they retire	1	4	0	0	8	0	0	0	1	14	2

Exhibit B.1

	FREQUENCIES OF RESPONSES BY DISTRICT	LOBSTER DISTRICTS										PER CENT
		27	28/29/30	31	32	33	34	35	36	38	Total	
103	unfair, discrimination, B licence holders can't sell or transfer licences	1	0	0	0	1	0	0	0	0	2	0
104	upgrade B licences before allowing any new licences to be issued	3	0	0	0	4	0	0	0	0	7	1
105	enforcement treatment unfair, unequal for B licence holders	0	0	0	0	2	0	0	0	0	2	0
106	should be compensation for those who lost A licences	0	0	0	0	2	0	0	0	0	2	0
107	taking A licence was unfair	0	1	0	0	4	0	0	0	0	5	1
108	B licences should be excluded to reduce effort, improve incomes	1	0	0	2	4	0	0	0	0	7	1
109	let older guy trade A for B licence, so younger guy moves up to A.	0	0	0	0	1	0	0	0	0	1	0
110	should be able to transfer B licence to young fisherman, then upgrade	1	0	0	0	1	0	0	0	0	2	0
111	fulltime fisherman with B licence should be allowed to upgrade	1	2	1	0	3	0	0	0	0	7	1
	10. FISHERMENS' INCOMES, EQUITY ISSUES, NEWCOMERS											
112	allow average incomes to rise before granting any more licences	0	0	0	0	1	0	0	0	0	1	0
113	set a limit on outside income while retaining licence (e.g., $30,000)	0	0	0	1	2	0	0	0	0	3	0
114	it is too expensive for young fishermen to get a start, to get in	0	0	0	0	1	0	0	0	0	1	0
115	young fishermen should be able to buy licences at affordable prices	0	0	0	1	5	0	0	0	0	6	1
116	fisherman should be able to pass licence to son	0	0	0	0	1	0	0	0	0	1	0
117	licences, trap quotas of older fishermen should go to younger ones	0	0	0	0	1	0	0	0	0	1	0
118	too many people fishing lobster who have other full-time jobs	1	0	0	4	10	0	0	0	0	15	2
119	a few are getting rich: more licences to spread wealth to more fishermen	0	0	1	0	0	2	0	0	0	3	0
120	at age 65, fishermen should be required to reduce effort, fish fewer traps	0	1	0	0	0	0	0	0	0	1	0
	11. OFFSHORE LOBSTER FISHING											
121	offshore fishing is ruining the inshore lobster fishery	0	0	0	0	1	4	0	1	0	6	1
122	granting more offshore licences will damage the inshore	1	1	1	0	2	7	0	0	0	12	2
123	large lobster are source of inshore stocks, must be protected	0	0	0	2	3	2	0	1	0	8	1
124	offshore fishing has no effect on inshore	0	0	0	0	1	0	0	0	0	1	0
125	shut down offshore lobster fishery entirely	0	0	0	0	0	4	0	1	0	5	1
126	no new offshore licences should be issued	2	1	3	3	4	16	0	1	0	30	4
127	should have same season as inshore	0	0	0	0	1	0	0	0	0	1	0
	12. SEASONS											
128	shorten season	0	0	0	2	10	0	0	0	0	12	2
129	lengthen season	3	1	2	0	2	0	0	1	1	10	1
130	close season Jan 1 to April 15	0	0	0	0	1	0	0	0	0	1	0
131	last week Nov to Jan 1, Apr 1 to May 31	0	0	0	0	3	0	0	0	0	3	0
132	last week Nov to end of Jan, Apr 15 to May 31	0	0	0	0	3	0	0	0	0	3	0
133	Nov 1 to May 1	0	0	0	0	1	0	0	0	0	1	0
134	Mid Nov to Jan 1, Apr 15 to June 5	0	0	0	0	1	0	0	0	0	1	0
135	1.5 months in fall, 1.5 months in spring	0	0	0	0	2	0	0	0	0	2	0
136	start season later - it's too early	0	0	0	0	0	0	0	1	0	1	0

Exhibit B.1

	FREQUENCIES OF RESPONSES BY DISTRICT	LOBSTER DISTRICTS										PER
		27	28/29/30	31	32	33	34	35	36	38	Total	CENT
137	spring 2 weeks longer, fall open first Tuesday in Nov.	0	0	0	0	0	1	0	0	0	1	0
138	earlier fall opening needed	0	0	0	0	0	0	0	2	0	2	0
139	close end July, open Nov 1, closed Feb and March	0	0	0	0	0	0	0	0	1	1	0
140	Nov 1 to Dec 30, Apr 1 to june 30	0	0	0	0	1	0	0	0	0	1	0
141	December and May only	0	0	0	0	2	0	0	0	0	2	0
142	Nov 26 to Jan 15, Apr 15 to May 31	0	0	0	0	2	0	0	0	0	2	0
143	Nov 15 to Dec 15, Apr 15 to June 15	0	0	0	0	2	0	0	0	0	2	0
144	from March to end of October	0	0	0	0	0	0	1	0	0	1	0
145	start earlier in Nov - better weather	0	0	0	0	1	0	0	1	0	2	0
146	open season 2 weeks earlier	1	0	0	0	0	0	0	5	1	7	1
147	7 weeks in fall, 5 weeks in spring	0	0	0	0	1	0	0	0	0	1	0
148	should have a fall season (e.g., on Bras D'Or Lakes)	2	0	0	0	0	0	0	0	0	2	0
149	close fishery for a yar on Bras D'Or Lakes	0	2	0	0	0	0	0	0	0	2	0
150	no change - leave it as it is	0	0	2	0	0	0	0	2	0	4	1
151	April 10 top June 20	0	0	2	0	0	0	0	0	0	2	0
152	Nov 15 to Dec 15, Apr 1 to May 15	0	0	0	0	1	0	0	0	0	1	0
153	close spring fishery to protect larger female breeders	0	0	0	0	1	0	0	0	0	1	0
	13. MISCELLANEOUS											
154	harbour improvements needed	1	0	0	0	0	0	0	0	0	1	0
155	surveys useless, a waste of time and money	1	0	1	3	5	5	0	0	1	16	2
156	more biological research needed	0	0	2	2	1	1	0	0	0	6	1
157	more biological research needed on inshore and offshore lobster	1	0	1	0	1	0	0	0	0	3	0
158	need to keep water clean, prevent pollution	0	0	0	0	1	0	0	0	0	1	0
159	biologists should collect spawn, seed local areas when 4 or 5 weeks old	0	0	0	1	1	0	0	0	0	2	0
160	management system favours rich, not for poor	1	0	0	0	0	1	0	0	0	2	0
161	this survey information will be used against fishermen	0	0	0	0	0	2	1	0	0	3	0
162	closure of scallop fishery has helped lobster fishery	0	0	0	0	0	0	0	1	0	1	0
163	need to do something about seals	0	0	0	0	1	1	0	0	1	3	0
164	very concerned about decreasing stocks, state of stocks	1	0	0	0	4	1	0	0	0	6	1
165	concern young people won't have a fishery in future, and about access	0	0	0	0	4	5	0	0	0	9	1
166	opposed to harvesting kelp, rock crabs - lobster depend on it	0	0	0	0	0	2	0	0	0	2	0
167	too many lobster landed - hurts price	0	0	0	0	1	3	0	0	0	4	1
168	more safety regulations required	0	0	0	0	0	2	0	0	0	2	0
169	groundfish draggers are hurting lobster fishery	4	1	1	0	1	3	1	1	0	12	2
170	opposed to lobster farming, to companies growing & selling lobster	1	0	0	0	0	0	0	0	0	1	0
171	after 2 years, licensed helpers get an extra 50 traps added to boat limit	0	0	1	0	0	0	0	0	0	1	0
172	sea urchins are a problem	0	0	1	0	1	0	0	0	0	2	0

Exhibit B.2

Exhibit B.2 **PERCENTAGE RESPONSE BY DISTRICT**

		PER CENT								
	LOBSTER DISTRICTS	27	28/29/30	31	32	33	34	35	36	38
	N	88	34	35	44	233	231	13	33	20
ITEM	1. GENERAL									
1	no major changes needed, leave it alone	2	0	14	0	2	5	0	0	0
	2. MANAGEMENT PROCESS									
2	not enough cooperation, DFO and fishermen, fishermen's groups	6	3	0	0	0	0	8	3	0
3	fishermen should have more say, more involvement	6	0	0	7	0	4	0	6	5
4	fishermen should run it themselves through elected bodies	1	0	0	0	0	0	0	0	0
5	administrators, bureaucrats should have less say	1	0	0	2	2	2	0	3	5
6	too many chiefs	0	6	0	0	0	0	0	0	0
7	object to decision for more offshore licenses (how it was made)	1	3	0	0	0	3	0	3	0
8	lobster advisory committee should run fishery	0	0	0	0	0	0	0	3	0
9	biologists should have more say/role	0	0	0	0	0	0	0	0	0
10	DFO field staff should have more say/role	0	0	0	0	0	0	0	0	0
11	too many changes in rules and regulations, can't keep up with them	2	0	0	0	1	1	0	3	0
12	DFO doesn't listen to fishermen's comments on surveys	0	3	0	0	0	2	0	3	0
13	DFO doesn't listen to lobster advisory committee(s)	0	0	0	0	1	0	0	0	0
14	over regulation, too much government involvement	1	0	0	2	0	2	0	0	0
15	decisions for our area influenced too much by fishermen from other areas	0	0	0	0	1	0	0	0	0
16	our area is unique, need regulations specific to our area	0	0	0	5	0	0	0	0	0
17	need more seminars to educate fishermen on management and protection	0	0	0	2	0	0	0	0	0
	3. SURVEILLANCE AND ENFORCEMENT									
18	trap limits not adequately enforced	17	6	0	7	17	35	8	3	40
19	size limits not adequately enforced, too many smalls landed	6	15	0	9	6	4	0	12	10
20	need more protection vs poaching (out of season fishing, raiding traps)	7	6	3	5	9	8	0	27	5
21	restrictions on landing females (berried lobsters) not adequately enforced	1	3	0	5	1	2	0	6	0
22	not enough patrol boats	1	6	0	0	0	0	0	6	0
23	not enough fisheries officers, or they aren't around enough	10	3	0	9	10	5	0	9	0
24	penalties not effective, not severe enough	8	3	3	18	4	8	0	3	0
25	surveillance inadequate on weekends	0	0	0	0	1	0	0	0	0
26	all fishing gear should have fishermen's name or number	0	0	0	2	2	1	0	0	0
27	if regulations strictly enforced, more licences could be issued	0	0	0	0	1	1	0	0	0
28	many/most fishermen misreport landings	0	0	0	0	0	0	0	0	0
29	need a better tag which will stay on trap	0	0	0	0	0	3	0	0	0
30	fisheries officers don't work hard enough, not diligent	0	12	0	0	1	1	8	0	0
31	in general, more surveillance and stricter enforcement needed	2	0	0	9	7	3	8	0	10
32	violaters should lose licence, give to new fishermen through a draw	0	0	0	2	0	0	0	0	0
33	in late 70s, heavy fines and suspensions were effective deterrents	0	0	0	2	0	0	0	0	0

Exhibit B.2

	PERCENTAGE RESPONSE BY DISTRICT	PER CENT								
	LOBSTER DISTRICTS	27	28/29/30	31	32	33	34	35	36	38
	4. REGULATING EFFORT									
34	there is too much effort, too many licences in my area	17	12	0	7	9	3	8	3	10
35	no new licenses should be issued	8	0	23	5	12	16	8	3	0
36	no more traps should be allowed	2	6	0	0	0	0	8	3	0
37	no transfer of licences into area should be allowed	7	0	0	0	3	0	8	0	0
38	ban Sunday fishing	0	0	0	0	3	1	15	0	0
39	have to overfish to keep share of catch because others do it	0	6	0	0	0	3	0	0	0
40	expect landings to fall off in future due to overfishing	0	0	0	5	3	3	0	0	5
41	put a limit on maximum boat size	0	0	0	0	0	0	0	0	0
42	more effort is now needed to maintain catch levels	1	0	0	0	0	0	8	0	0
43	set a 10 to 12 mile buffer zone between inshore / offshore lobster fishing	0	0	0	0	0	0	0	0	0
44	should be a quota system, a catch limit per vessel or licence	0	3	0	0	0	2	0	0	5
45	catchs are now better due to good management	9	0	9	5	1	0	0	0	0
46	distribute more licenses to full time fishermen	0	6	0	0	0	1	0	0	0
47	need to reduce effort significantly to protect stocks	0	0	0	2	0	1	0	0	5
48	a buy-back programme should be instituted to reduce effort	0	0	0	0	0	0	0	0	0
	5. CARAPACE SIZE									
49	increase minimum carapace size	10	0	0	2	2	1	0	3	5
50	go to US carapace size limit	0	0	0	2	1	1	0	3	0
51	leave carapace sizes as they are (keep canners)	2	0	3	2	1	1	15	3	0
52	have a maximum carapace size limit (e.g. 5 ") to protect big lobster	0	0	0	0	2	1	0	0	0
53	ban fishing of "jumbos"	0	0	0	0	1	0	0	0	5
54	do away with canners	1	0	0	0	0	0	8	0	0
55	decrease minimum carapace size	0	0	3	0	0	0	0	0	0
	6. TRAP LIMIT									
56	trap limit should be reduced	1	0	0	5	4	2	0	3	10
57	strictly enforce trap limits or do away with them	0	0	0	2	1	7	0	3	0
58	there is no need for trap limit	0	0	0	0	0	2	0	0	0
59	many/most fishermen overfish trap limit	2	0	0	0	12	15	8	3	10
60	should be 400	0	0	0	0	0	1	0	0	0
61	keep it the same and strictly enforce	0	9	0	0	1	3	8	0	0
62	should be 200	1	0	0	9	2	0	0	0	0
63	should be 150	0	0	0	2	3	0	0	0	0
64	should be 175	0	0	0	0	0	0	0	0	0
65	it works - leave it as it is	0	0	0	0	0	0	0	0	0
66	should be 300	1	0	0	0	0	2	0	0	15
67	it's a failure, it's unworkable	0	0	0	0	1	2	0	0	0
68	600 traps in December, 600 traps Apr 15 - May 31.	0	0	0	0	0	0	0	0	0

Exhibit B.2

	PERCENTAGE RESPONSE BY DISTRICT	PER CENT								
	LOBSTER DISTRICTS	27	28/29/30	31	32	33	34	35	36	38
69	it's the honest man who suffers from non-enforcement	0	0	0	0	2	3	0	0	0
70	should be 500	0	0	0	0	0	1	0	0	0
71	trap limit 250	1	0	0	0	0	0	0	0	0
	7. TRAP DESIGN AND FISHING METHODS									
72	escape hatches should be required	3	0	6	5	1	1	0	6	0
73	escape hatches don't work, against them	0	0	0	0	3	0	0	0	0
74	maximum size for fishing bows or rings should be 6"	0	0	0	2	1	0	0	0	0
75	ban or limit the use of traps on trawls	0	0	0	0	3	0	0	0	5
76	limit number of traps per trawl (e.g., 15)	0	0	0	0	0	0	0	0	0
77	strictly control lathe spacing	0	0	0	0	1	0	0	0	0
78	need escape method for lost wire or steel traps to prevent ghost fishing	0	0	0	0	0	1	8	3	0
79	limit trap moorings max 5 fathoms - long moorings a safety hazard	0	0	0	0	0	0	0	0	0
80	something must be done to prevent lost traps from continuing to fish	0	0	0	0	0	1	0	0	0
81	should have two days to set traps, not one, for safety reasons	0	0	0	0	0	0	0	0	0
82	entrance rings should be max. 5"	0	0	0	0	0	0	0	0	0
83	disapprove of wire traps	0	0	0	0	0	0	0	0	0
	8. LICENCES									
84	more flexibility needed	0	0	0	2	0	0	0	0	0
85	quicker processing of applications, appeals, etc.	0	3	0	0	0	0	0	0	0
86	allow only full-time, professional fishermen to have A licences	0	0	0	5	1	0	0	0	0
87	should be open access to licences (like U.S.)	0	0	0	0	0	1	8	3	0
88	allow only full-time fishermen to fish lobster	0	0	0	0	1	0	0	3	5
89	disapprove of licensing system in general	1	0	0	0	1	1	0	6	0
90	no selling of licences - they should revert to DFO	0	0	3	2	1	0	0	0	0
91	companies or individuals shouldn't have licences, pay others to fish them	0	3	0	0	3	0	0	0	0
92	a fisherman who sold a licence should not be able to get it back	0	0	0	0	0	0	0	0	0
93	should be able to transfer licence boat to boat as before	0	0	0	0	1	0	0	0	0
94	should not be able to sell licences from one area into another	1	0	0	2	0	0	0	0	0
95	opposed to double licences - 2 licences per boat	0	0	0	0	0	1	0	0	10
96	licences should be available to give young fishermen access to industry	0	0	0	0	1	1	0	0	0
97	support double licences - 2 licences per boat	0	0	0	0	0	0	0	0	0
98	no-one should be allowed to hold more than 1 licence	0	0	0	0	0	0	0	0	0
99	should be able to sell lobster licences to highest bidder	0	0	0	0	1	0	0	0	0
100	regulation against A licence holders having other jobs is unjust	0	0	3	0	0	0	0	0	0
	9. B LICENCES									
101	increase trap limit for B licence holders	1	12	0	2	1	0	0	0	5
102	B licence holders should get A licences back when they retire	1	0	0	0	3	0	0	0	5

Exhibit B.2

	PERCENTAGE RESPONSE BY DISTRICT	PER CENT								
	LOBSTER DISTRICTS	27	28/29/30	31	32	33	34	35	36	38
103	unfair, discrimination, B licence holders can't sell or transfer licences	1	0	0	0	0	0	0	0	0
104	upgrade B licences before allowing any new licences to be issued	3	0	0	0	2	0	0	0	0
105	enforcement treatment unfair, unequal for B licence holders	0	0	0	0	1	0	0	0	0
106	should be compensation for those who lost A licences	0	3	0	0	1	0	0	0	0
107	taking A licence was unfair	0	0	0	0	2	0	0	0	0
108	B licences should be excluded to reduce effort, improve incomes	1	0	0	5	2	0	0	0	0
109	let older guy trade A for B licence, so younger guy moves up to A.	0	0	0	0	0	0	0	0	0
110	should be able to transfer B licence to young fisherman, then upgrade	1	6	0	0	0	0	0	0	0
111	fulltime fisherman with B licence should be allowed to upgrade	1	0	3	0	1	0	0	0	0
	10. FISHERMENS' INCOMES, EQUITY ISSUES, NEWCOMERS									
112	allow average incomes to rise before granting any more licences	0	0	0	0	0	0	0	0	0
113	set a limit on outside income while retaining licence (e.g., $30,000)	0	0	0	2	1	0	0	0	0
114	it is too expensive for young fishermen to get a start, to get in	0	0	0	0	0	0	0	0	0
115	young fishermen should be able to buy licences at affordable prices	0	0	0	2	2	0	0	0	0
116	fisherman should be able to pass licence to son	0	0	0	0	0	0	0	0	0
117	licences, trap quotas of older fishermen should go to younger ones	0	0	0	0	0	0	0	0	0
118	too many people fishing lobster who have other full-time jobs	1	0	0	9	4	0	0	0	0
119	a few are getting rich: more licences to spread wealth to more fishermen	0	3	3	0	0	1	0	0	0
120	at age 65, fishermen should be required to reduce effort, fish fewer traps	0	0	0	0	0	0	0	0	0
	11. OFFSHORE LOBSTER FISHING									
121	offshore fishing is ruining the inshore lobster fishery	0	3	0	0	0	2	0	3	0
122	granting more offshore licences will damage the inshore	1	0	3	0	1	3	0	0	0
123	large lobster are source of inshore stocks, must be protected	0	0	0	5	1	1	0	3	0
124	offshore fishing has no effect on inshore	0	0	0	0	0	0	0	0	0
125	shut down offshore lobster fishery entirely	0	3	0	0	0	2	0	3	0
126	no new offshore licences should be issued	2	0	9	7	2	7	0	3	0
127	should have same season as inshore	0	0	0	0	0	0	0	0	0
	12. SEASONS									
128	shorten season	0	3	0	5	4	0	0	0	0
129	lengthen season	3	0	6	0	1	0	0	3	5
130	close season Jan 1 to April 15	0	0	0	0	0	0	0	0	0
131	last week Nov to Jan 1, Apr 1 to May 31	0	0	0	0	1	0	0	0	0
132	last week Nov to end of Jan, Apr 15 to May 31	0	0	0	0	1	0	0	0	0
133	Nov 1 to May 1	0	0	0	0	0	0	0	0	0
134	Mid Nov to Jan 1, Apr 15 to June 5	0	0	0	0	0	0	0	0	0
135	1.5 months in fall, 1.5 months in spring	0	0	0	0	1	0	0	0	0
136	start season later - it's too early	0	0	0	0	0	0	0	3	0

Exhibit B.2

	PERCENTAGE RESPONSE BY DISTRICT	PER CENT								
	LOBSTER DISTRICTS	27	28/29/30	31	32	33	34	35	36	38
137	spring 2 weeks longer, fall open first Tuesday in Nov.	0	0	0	0	0	0	0	0	0
138	earlier fall opening needed	0	0	0	0	0	0	0	6	0
139	close end July, open Nov 1, closed Feb and March	0	0	0	0	0	0	0	0	5
140	Nov 1 to Dec 30, Apr 1 to june 30	0	0	0	0	0	0	0	0	0
141	December and May only	0	0	0	0	1	0	0	0	0
142	Nov 26 to Jan 15, Apr 15 to May 31	0	0	0	0	1	0	0	0	0
143	Nov 15 to Dec 15, Apr 15 to June 15	0	0	0	0	1	0	0	0	0
144	from March to end of October	0	0	0	0	0	0	8	0	0
145	start earlier in Nov - better weather	0	0	0	0	0	0	0	3	0
146	open season 2 weeks earlier	1	0	0	0	0	0	0	15	5
147	7 weeks in fall, 5 weeks in spring	0	0	0	0	0	0	0	0	0
148	should have a fall season (e.g., on Bras D'Or Lakes)	2	6	0	0	0	0	0	0	0
149	close fishery for a yar on Bras D'Or Lakes	0	0	0	0	0	0	0	0	0
150	no change - leave it as it is	0	0	6	0	0	0	0	6	0
151	April 10 top June 20	0	0	6	0	0	0	0	0	0
152	Nov 15 to Dec 15, Apr 1 to May 15	0	0	0	0	0	0	0	0	0
153	close spring fishery to protect larger female breeders	0	0	0	0	0	0	0	0	0
	13. MISCELLANEOUS									
154	harbour improvements needed	1	0	0	0	0	0	0	0	0
155	surveys useless, a waste of time and money	1	0	3	7	2	2	0	0	5
156	more biological research needed	0	0	6	5	0	0	0	0	0
157	more biological research needed on inshore and offshore lobster	1	0	3	0	0	0	0	0	0
158	need to keep water clean, prevent pollution	0	0	0	0	0	0	0	0	0
159	biologists should collect spawn, seed local areas when 4 or 5 weeks old	0	0	0	2	0	0	0	0	0
160	management system favours rich, not for poor	1	0	0	0	0	0	0	0	0
161	this survey information will be used against fishermen	0	0	0	0	0	1	8	0	0
162	closure of scallop fishery has helped lobster fishery	0	0	0	0	0	0	0	3	0
163	need to do something about seals	0	0	0	0	0	0	0	0	5
164	very concerned about decreasing stocks, state of stocks	1	0	0	0	2	0	0	0	0
165	concern young people won't have a fishery in future, and about access	0	0	0	0	2	2	0	0	0
166	opposed to harvesting kelp, rock crabs - lobster depend on it	0	0	0	0	0	1	0	0	0
167	too many lobster landed - hurts price	0	0	0	0	0	1	0	0	0
168	more safety regulations required	0	3	0	0	0	1	0	0	0
169	groundfish draggers are hurting lobster fishery	5	0	3	0	0	1	8	3	0
170	opposed to lobster farming, to companies growing & selling lobster	1	0	0	0	0	0	0	0	0
171	after 2 years, licensed helpers get an extra 50 traps added to boat limit	0	0	3	0	0	0	0	0	0
172	sea urchins are a problem	0	0	3	0	0	0	0	0	0